The PHOTOFACT Servicer

SET 460 ★ *Published for all users of Howard W. Sams Photofact Folders* ★ OCT., 1959

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This Servicer provides you with essential data on other models or special equipment not covered in standard PHOTOFACT folders. The schematics and supplementary data included here will be of valuable help to you in servicing this equipment.

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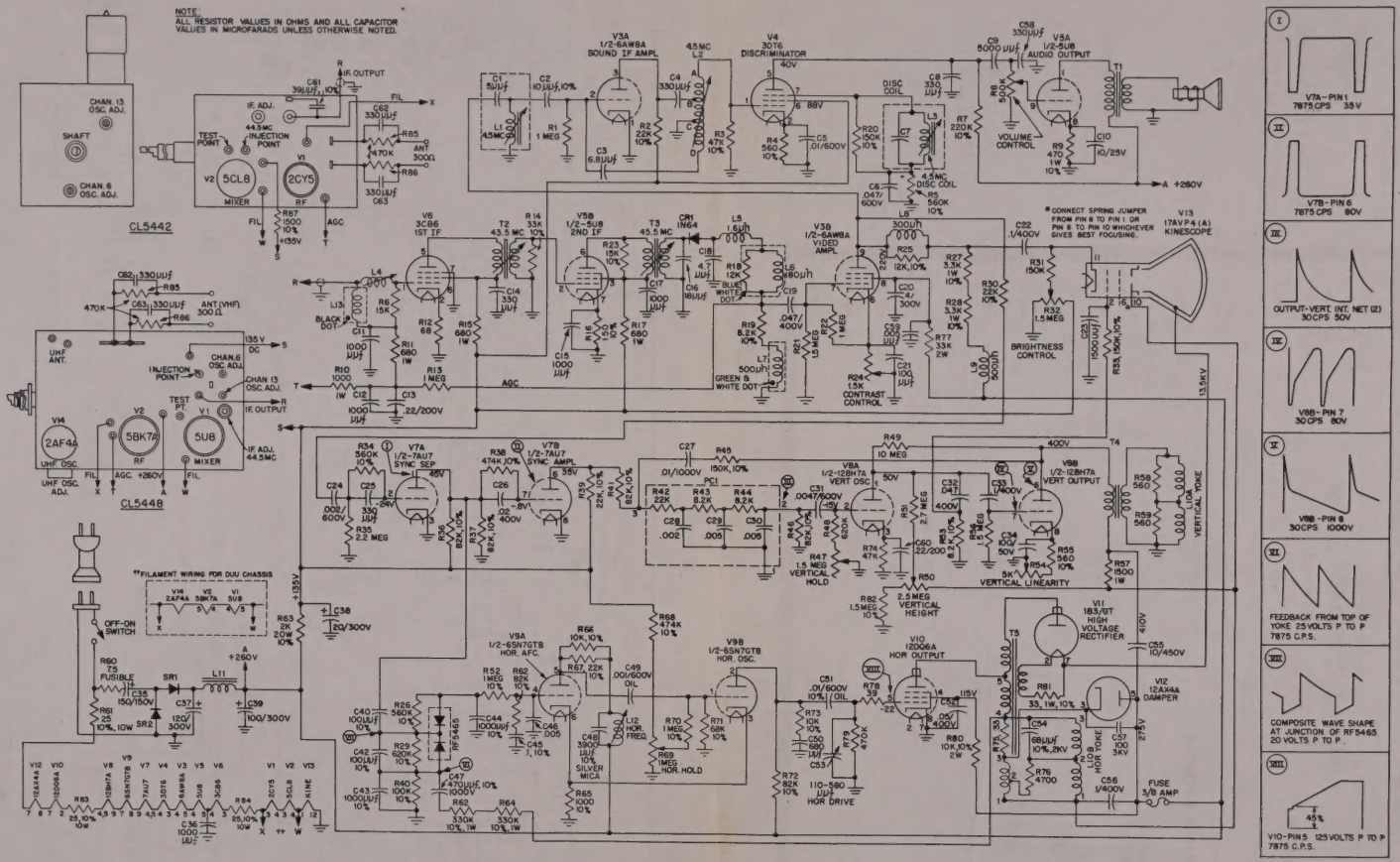
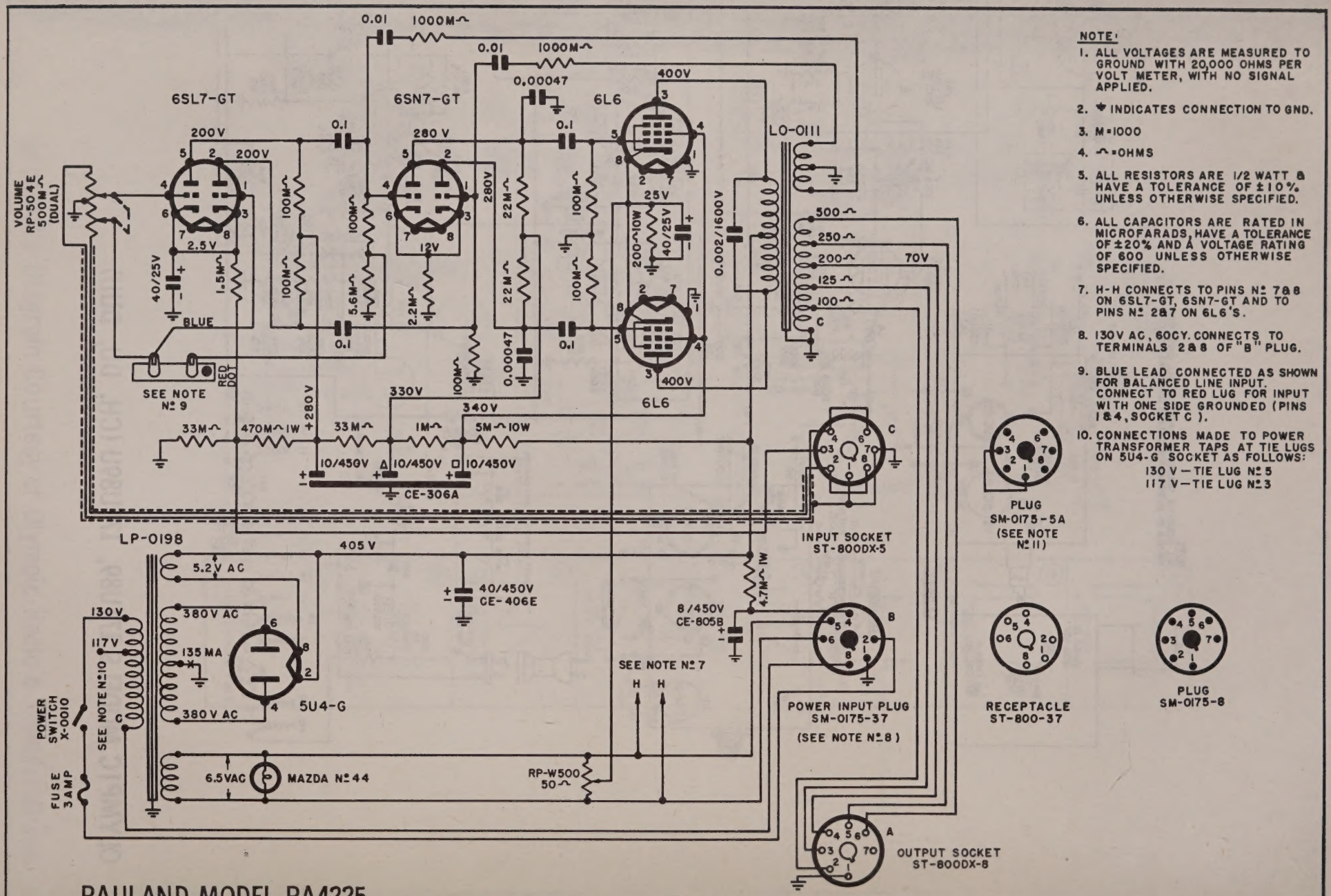
17TU89, 17TU89U
(CH. DU, DUU)

Rauland Model
RA4225



OLYMPIC MODELS 17TU89, 17TU89U (CH. DU, DUU)

Schematic Diagram Courtesy of Olympic Radio & Television Inc.



NOTE:

1. ALL VOLTAGES ARE MEASURED TO GROUND WITH 20,000 OHMS PER VOLT METER, WITH NO SIGNAL APPLIED.
2. * INDICATES CONNECTION TO GND.
3. M = 1000
4. ~ = OHMS
5. ALL RESISTORS ARE 1/2 WATT & HAVE A TOLERANCE OF ±10% UNLESS OTHERWISE SPECIFIED.
6. ALL CAPACITORS ARE RATED IN MICROFARADS, HAVE A TOLERANCE OF ±20% AND A VOLTAGE RATING OF 600 UNLESS OTHERWISE SPECIFIED.
7. H-H CONNECTS TO PINS Nº 7&8 ON 6SL7-GT, 6SN7-GT AND TO PINS Nº 2&7 ON 6L6'S.
8. 130V AC, 60CY. CONNECTS TO TERMINALS 2&8 OF "B" PLUG.
9. BLUE LEAD CONNECTED AS SHOWN FOR BALANCED LINE INPUT. CONNECT TO RED LUG FOR INPUT WITH ONE SIDE GROUNDED (PINS 1&4, SOCKET C).
10. CONNECTIONS MADE TO POWER TRANSFORMER TAPS AT TIE LUGS ON 5U4-G SOCKET AS FOLLOWS:
    130 V — TIE LUG Nº 5
    117 V — TIE LUG Nº 3

RAULAND MODEL RA4225

Schematic Diagram Courtesy of Rauland-Borg Corp.

PHOTOFACT* Folder with CIRCUITRACE*

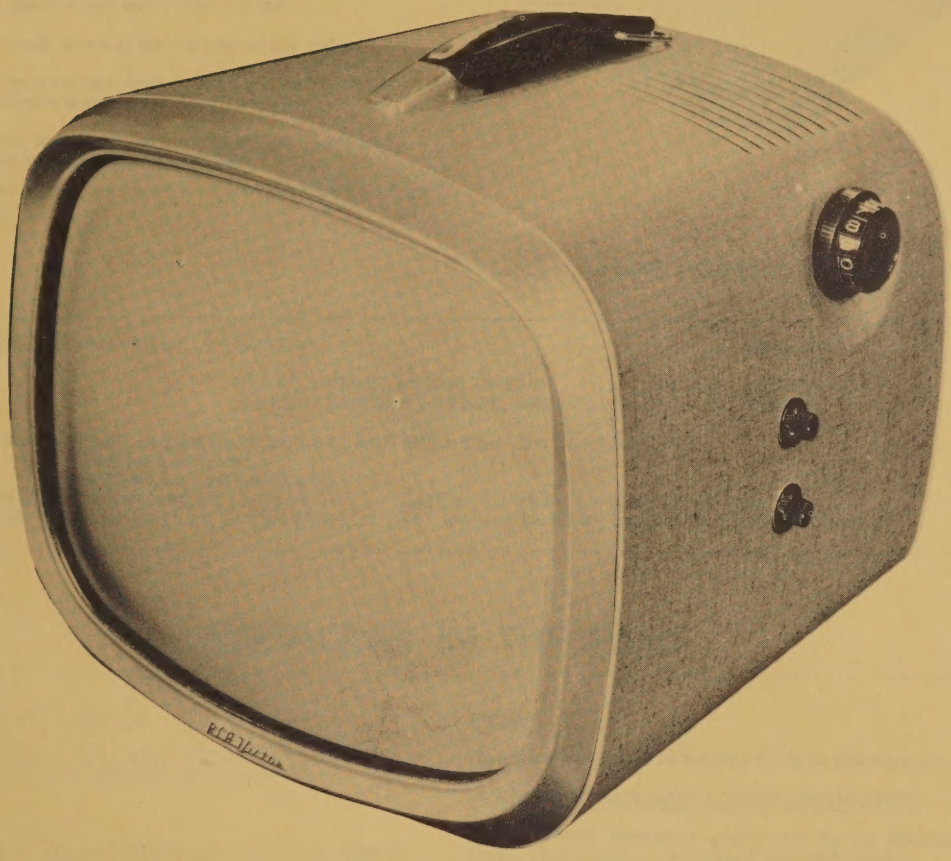
RCA VICTOR MODELS 140P012, U, 140P020, U, 140P023, U, 140P024, U (Ch. KCS120E, F)

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

RCA VICTOR MODELS 140P012, U, 140P020, U, 140P023, U, 140P024, U (Ch. KCS120E, F)



RCA VICTOR MODELS 140P012, U, 140P020, U, 140P023, U, 140P024, U (Ch. KCS120E, F)

MODEL 140P023 (Ch. KCS120E)

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The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

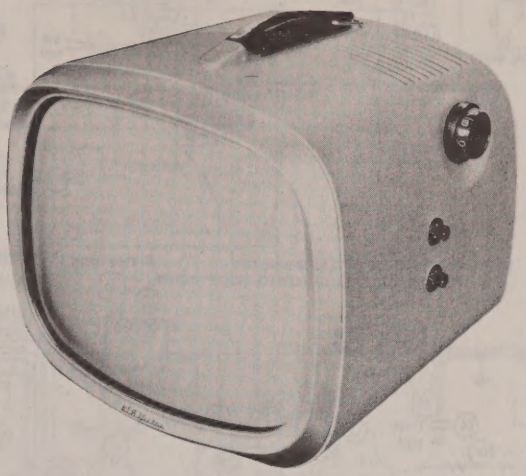
RCA VICTOR MODELS 140P012, U, 140P020, U, 140P023, U, 140P024, U (Ch. KCS120E, F)

RCA VICTOR MODELS 140P012, U, 140P020, U, 140P023, U, 140P024, U (Ch. KCS120E, F)

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL MODEL 140P023

1. Remove 8 phillips head screws holding rear cover. Remove rear cover. Remove antenna leads to tuner.
2. Remove 2 metal screws holding the front from bottom. Pull out at the bottom and lift to remove.
3. Remove 4 push-on type knobs from the side.
4. Remove 1 metal screw at the top rear of the cabinet.
5. Place the receiver face down on a pad and remove 8 phillips type screws from the bottom of the chassis.
6. Spring sides of cabinet outward just enough to clear the chassis and lift cabinet off the chassis.



MODEL 140P023 (Ch. KCS120E)

TRADE NAME	RCA Victor	MODELS	CHASSIS
		140P012, 140P020, 140P023, 140P024	KCS120E
		140P012U, 140P020U, 140P023U, 140P024U	KCS120F
MANUFACTURER	Radio Corporation of America, RCA Victor Tele. Div., Camden 8, N.J.		
TYPE SET	Television Receiver		
TUBES	VHF-Sixteen, UHF-Seventeen		
POWER SUPPLY	110-120 Volts AC, 60 Cycle	RATING 150 Watts, 1.4 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

SERVICING IN THE FIELD

SAFETY GLASS REMOVAL

Remove 2 metal screws holding the front from the bottom. Pull front out at the bottom and lift to remove.

FUSE

Two fuse wires are used for filament protection. (For location, see M1 and M2 in photo "Chassis Bottom View").

FUSE DEVICE

A 20Ω fusible resistor (R79) is used for horiz. sweep circuit supply protection. (For location, see "Tube Placement Chart".)

TUNER OSCILLATOR ADJUSTMENTS

To touch-up the VHF Oscillator, remove Channel Selector and Fine Tuning knobs.

AGC

No provision is made to vary the AGC on this receiver.

FOCUS

No provision is made to vary the focus on this receiver.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

The Horizontal Frequency slug is used for the Horizontal Hold. (For location, see "Tube Placement Chart".)

WIDTH

The width may be varied by a Width coil. (For location, see "Tube Placement Chart".)

CENTERING

Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

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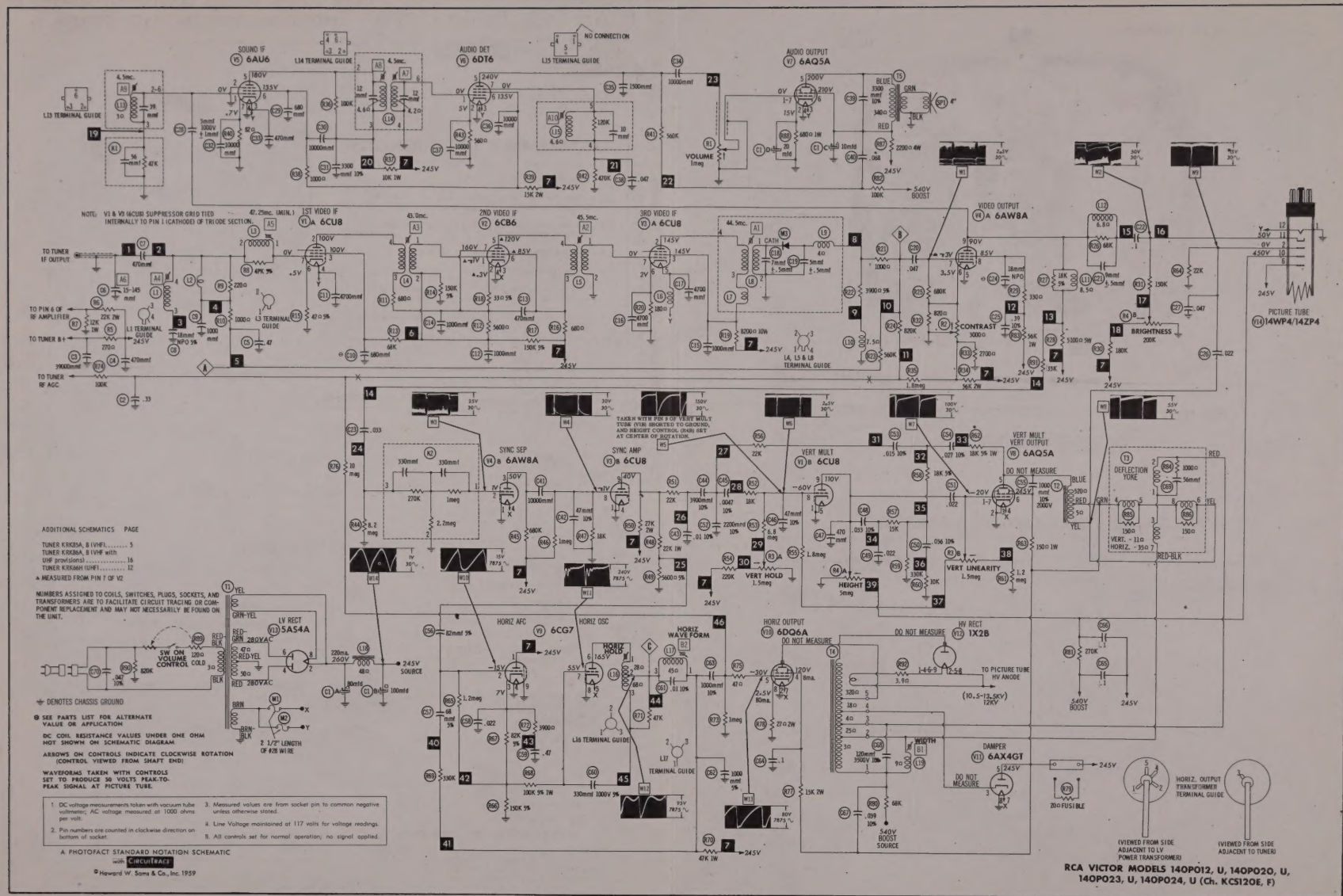
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

JA550

SET 460 FOLDER 1


SOUND IF V5 6AU6
AUDIO DET V6 6DT6
AUDIO OUTPUT V7 6AQ5A
VOLUME 1meg
1ST VIDEO IF V1A 6CU8
2ND VIDEO IF V2 6CB6
3RD VIDEO IF V3A 6CU8
VIDEO OUTPUT V4A 6AW8A
CONTRAST 3000Ω
BRIGHTNESS 200K
PICTURE TUBE V14 14WP4/14ZP4
TO TUNER IF OUTPUT
TO PIN 6 OF RF AMPLIFIER
TO TUNER B+
TO TUNER RF AGC
SYNC SEP V4B 6AW8A
SYNC AMP V3B 6CU8
VERT MULT V1B 6CU8
VERT MULT VERT OUTPUT V8 6AQ5A
VERT LINEARITY 1.5meg
VERT HOLD 1.5meg
HEIGHT 5meg
DEFLECTION YOKE
HORIZ AFC V9 6CG7
HORIZ OSC
HORIZ WAVEFORM
HORIZ OUTPUT V10 6DQ6A
HV RECT V12 1X2B
DAMPER V11 6AX4GT
WIDTH
LV RECT V13 5AS4A
SW ON VOLUME CONTROL
540V BOOST
540V BOOST SOURCE
245V SOURCE
TO PICTURE TUBE HV ANODE
(10.5-13.5KV) 12KV
DO NOT MEASURE
20A FUSIBLE
HORIZ. OUTPUT TRANSFORMER TERMINAL GUIDE
(VIEWED FROM SIDE ADJACENT TO LV POWER TRANSFORMER)
(VIEWED FROM SIDE ADJACENT TO TUNER)
L13 TERMINAL GUIDE
L14 TERMINAL GUIDE
L15 TERMINAL GUIDE
L16 TERMINAL GUIDE
L17 TERMINAL GUIDE
L4, L5 & L6 TERMINAL GUIDE
L1 TERMINAL GUIDE
L3 TERMINAL GUIDE
NO CONNECTION
TAKEN WITH PIN 2 OF VERT MULT TUBE (V1B) SHORTED TO GROUND, AND HEIGHT CONTROL (R49) SET AT CENTER OF ROTATION.
NOTE: V1 & V3 (6CU8) SUPPRESSOR GRID TIED INTERNALLY TO PIN 1 (CATHODE) OF TRIODE SECTION.
ADDITIONAL SCHEMATICS PAGE
TUNER KRK28A, B (VHF)..... 5
TUNER KRK28A, B (VHF with UHF provisions)..... 16
TUNER KRK66H (UHF)..... 12
▲ MEASURED FROM PIN 7 OF V2
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
DENOTES CHASSIS GROUND
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM.
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 30 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1000 ohms per volt.
2. Pin numbers are counted in clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
i. Line Voltage maintained at 117 volts for voltage readings.
ii. All controls set for normal operation; no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE
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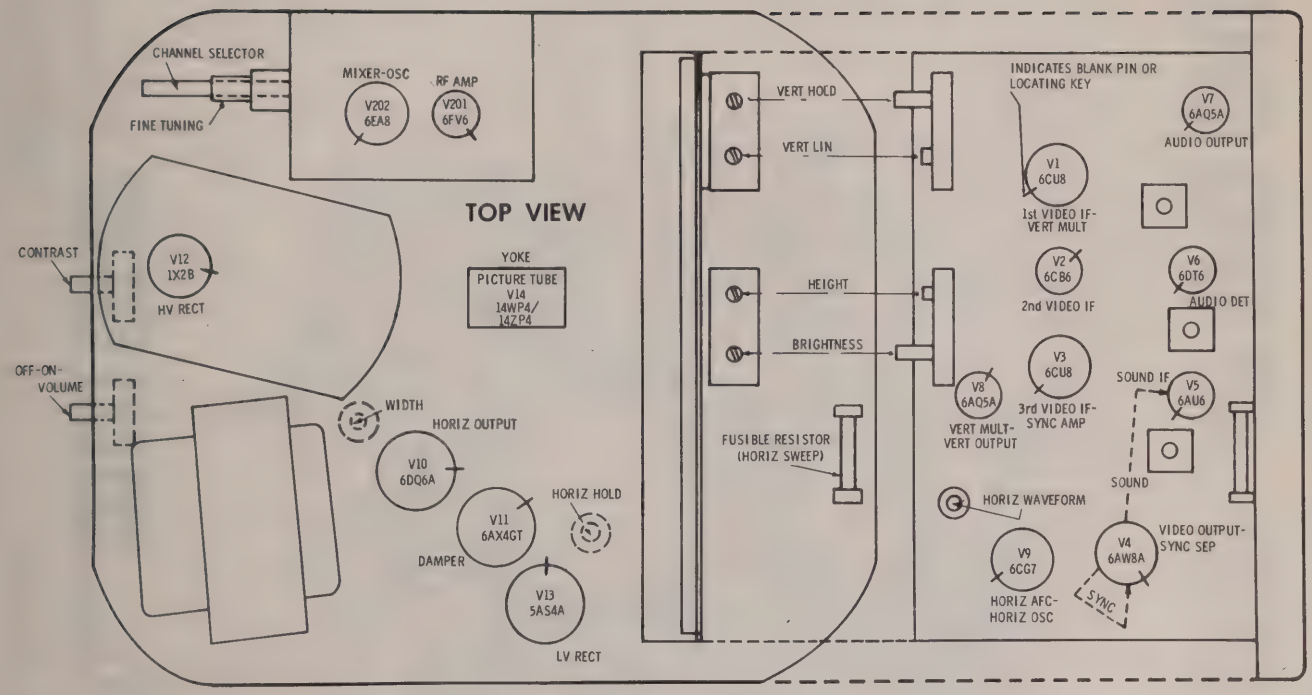
RCA VICTOR MODELS 140P012, U, 140P020, U, 140P023, U, 140P024, U (Ch. KCS120E, F)

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound V13, Fuses (Filament)

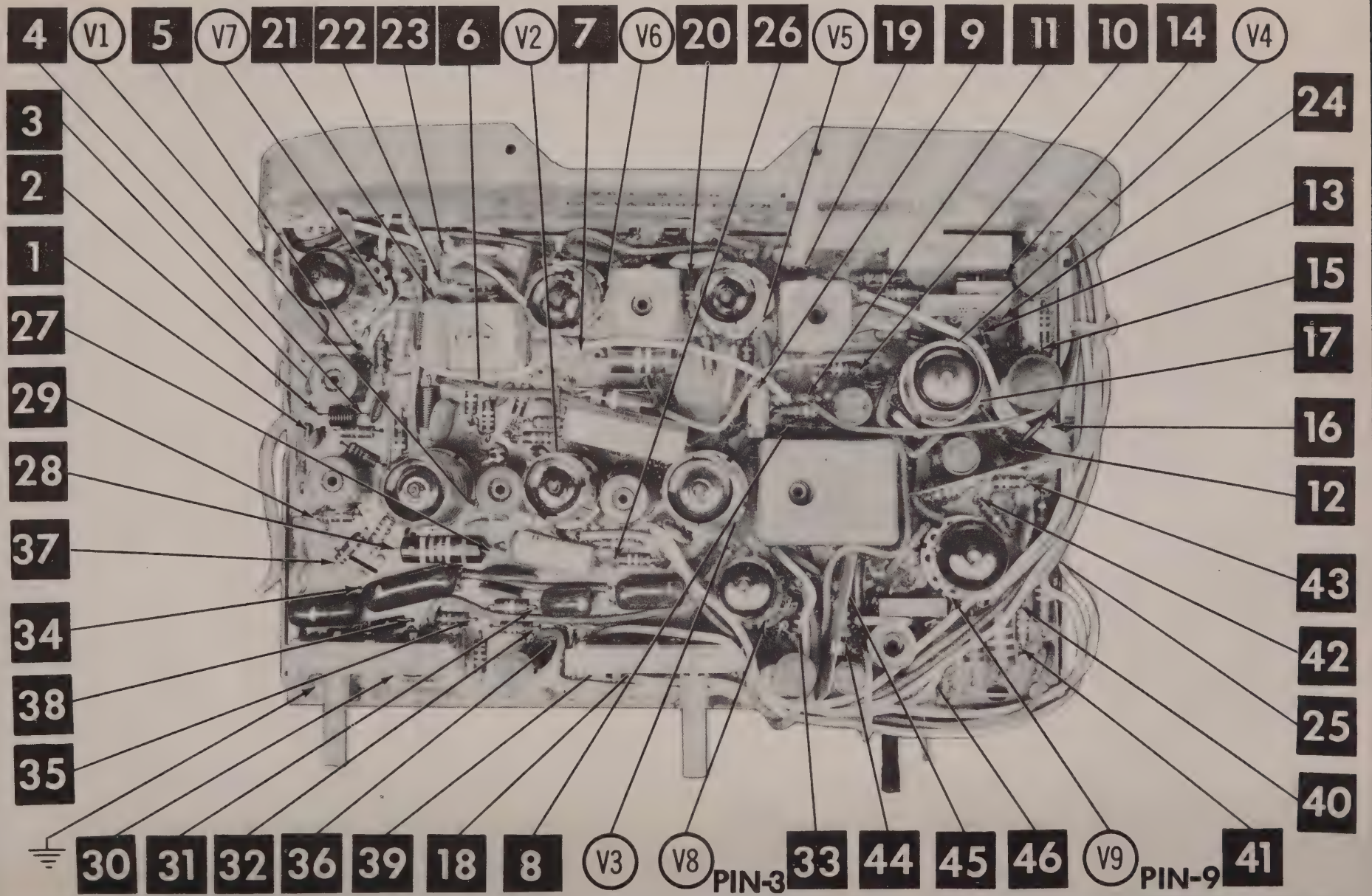
SWEEP FAILURE
No raster, has sound Fusible Resistor (Horiz. Sweep), V9, V10, V11, V12,
No vertical deflection V1, V8 V14, V13
Poor vert. linearity or foldover V1, V8
Poor horiz. linearity or foldover V9, V10, V11
Narrow picture V13, V9, V10, V11
Vert. off freq. V1
Horiz. off freq. V9

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, V4
No pic, no sound, has snow V201, V202, V1
No pic, has sound, has raster V4, V14
Has pic, no sound V5, V6, V7

SYNC FAILURE
No vert. sync V1
No horiz. sync V9
No vert. or horiz. sync V4, V3

RCA VICTOR MODELS 14OP012, U, 14OP020, U, 14OP023, U, 14OP024, U (Ch. KCS120E, F)

FOLDER 1



A Howard W. Sams CIRCUITRACE® Photo

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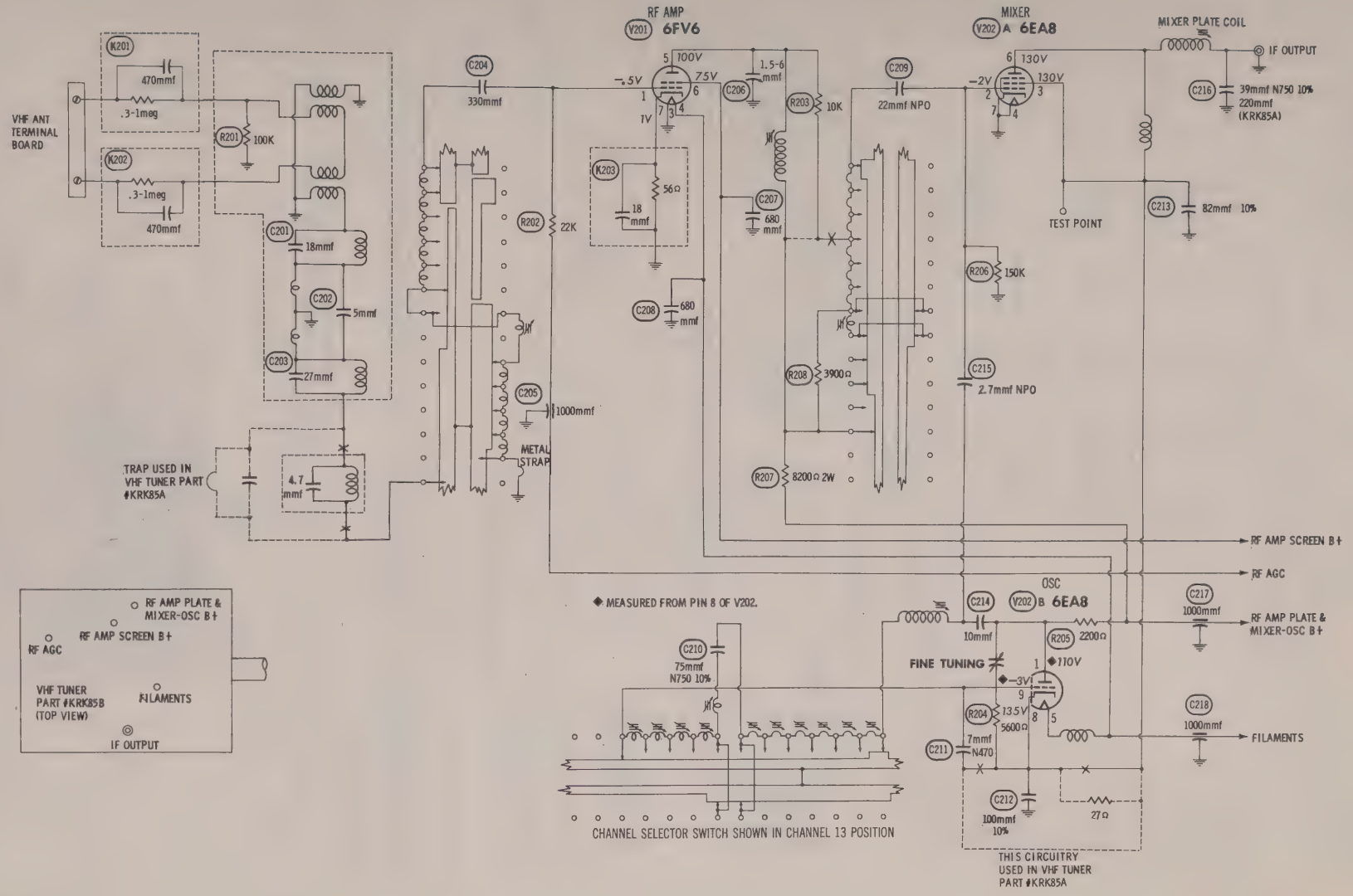
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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VHF TUNER KRK85A, B

RCA VICTOR MODELS 140P012, U, 140P020, U, 140P023, U, 140P024, U (Ch. KCS120E, F)

TUNER KRK85B

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	6FV6	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	6EA8	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	18				DI -18	DD-180	L10Q18	CNO-418	5GA-Q18	
C202	5				NPO-DI 5	DD-050	L10V5	ZT-555	5GA-V5	
C203	27				DI-27	DD-270	L10Q27	CNO-427	5GA-Q27	
C204	330				BPD-00033	DD-331	L10T33	B-333	5GA-T33	
C205	1000				EF-001	MFT-1000			503C-D1	
C206	1.5-6					829-6		CT-552		
C207	680				BPD-00068	DD-681	L10T68	B-368	5GA-T68	
C208	680				BPD-00068	DD-681	L10T68	B-368	5GA-T68	
C209	22		NPO		NPO-DI 22	DTZ-22	C10Q22C	CNO-422	5TCC-Q22	
C210	75		N750 10%		N750-DI 75	DTN-75	C10Q75U		5TCU-Q75S 10%*	
C211	7		N470							
C212	100		10%		ADM-15-101 10% *	DD-101	22A5T1	CNO-310	MS-31	
C213	82		10%		ADM-15-820 10% *	DD-820	22A5Q82	CNO-482	MS-482	
C214	10				SI 10	DD-100	L10Q1	UC-541	5GA-Q1	
C215	2.7		NPO						5TCCB-V27S	
C216	39		N750 10%			TCN-39	C10Q39U	CN7-439	5TCU-Q39S 10% *	
C217	1000				EF-001	MFT-1000			503C-D1	
C218	1000				EF-001	MFT-1000			503C-D1	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		RCA Victor PART No.	NOTES
	OHMS	WATT		
R201	100K			
R202	22K			
R203	10K			
R204	5600Ω			

ITEM No.	RATING		RCA Victor PART No.	NOTES
	OHMS	WATT		
R205	2200Ω			
R206	150K			
R207	8200Ω	2		
R208	3900Ω			

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	RCA Victor PART No.	REPLACEMENT DATA	
K201	Antenna Isolation	470mmf, .3-1meg	104328	Centralab Sprague	RC-471 AC1-1
K202	Antenna Isolation	470mmf, .3-1meg	140328	Centralab Sprague	RC-471 AC1-1
K203	RF Cath. Bypass	18mmf, 56Ω			

PRE-ALIGNMENT INSTRUCTIONS

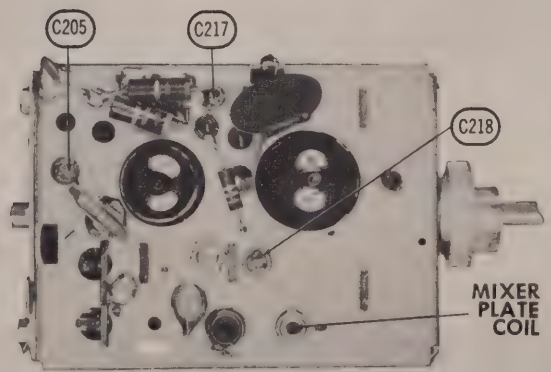
Suggested Alignment Tools: GENERAL CEMENT #8607, 9291
WALSCO #2520, 2522, 2523, 2524, 2537

OSCILLATOR ALIGNMENT

Set the Fine Tuning to the center of its range. Channel 13 slug is located on top of the tuner in front of the Oscillator tube. Channel 12 thru 2 adjustments are located on the front of the tuner in a circle around the shaft. The adjustments should be made in sequence from the highest to the lowest in the area. Channel 12 adjustment is located near top of tuner. Proceed in a counterclockwise direction adjusting for best picture and sound.

RF AND MIXER ALIGNMENT

This portion of the tuner has been properly aligned at the factory and is very stable. Alignment of this portion should not be attempted in the field.



TOP VIEW

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools :

A1, A2, A3, A4, A5, A7, A8, A9, All	General Cement #8282, 8606, 8606L, 9295 Walsco #2543, 2544, 2545
A6	General Cement #9291 Walsco #2520, 2522
A10	General Cement #8721, 8722 Walsco #2519

VIDEO IF ALIGNMENT

Connect the negative lead of a 4 volt bias supply to point Ⓐ. Positive to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	1500mmf Ceramic Capacitor	High side to Mixer Grid wafer contact thru access hole (adjacent to Mixer Grid wafer) located in left side of tuner shield. Low side to chassis.	44.5MC (Unmod)	Any non-interfering channel	DC probe to point Ⓑ. Common to chassis. (Across Video Detector load)	A1	Adjust for maximum gain. Adjust generator output for 3 volts on meter when finally peaked.
2.	"	"	45.5MC	"	"	A2	"
3.	"	"	43.0MC	"	"	A3	"
4.	"	"	47.25MC	"	"	A4	Adjust for MINIMUM deflection

OVERALL VIDEO IF RESPONSE CHECK

Connect bias as under "Video IF Alignment".
Connect a 180Ω resistor from pin 5 (plate) to pin 6 (screen) of the 1st. Video IF Amplifier tube (V1).
Couple signal generator loosely to sweep output cable to provide markers.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	1500mmf Ceramic Capacitor	High side to Mixer Grid wafer contact thru access hole (adjacent to Mixer Grid wafer) located on left side of tuner shield. Low side to chassis.	45MC (10MC Swp)	42.5MC 45.75MC 47.25MC	4	Vert. Amp. thru detector probe to pin 5 (plate) of 1st. Video IF Amp. (V1). Low side to chassis. Calibrate scope for .5 volts peak to peak.	A5, A6, & Mixer Plate Coil	Use only enough sweep generator output to provide a usable pattern on scope. Adjust Mixer Plate Coil and A5 for maximum gain, using A6 to obtain curve shape with markers as shown in Fig. 1. Remove 180Ω resistor from V1.
6.	"	"	"	"	"	Vert. Amp. thru 10K to point Ⓑ. Low side to chassis. (Across Video Det. load) Calibrate scope for 5 volts peak to peak.	A1, A2, A3	Check for response similar to Fig. 2. If necessary, retouch A1, A2 and A3 for desired response.
7.	Fig. 3	High side thru pad (Fig. 3) to Mixer Grid wafer contact thru access hole (adjacent to Mixer Grid wafer) located in left side of tuner shield. Low side to chassis.	Not used	45.75MC	"	USE VTVM. DC probe to point Ⓑ. Common to chassis.		Adjust generator output to provide exactly 1.5 volts on VTVM.
8.	1500mmf Ceramic Capacitor	Remove pad. High side to Mixer Grid wafer contact thru access hole (adjacent to Mixer Grid wafer) located in left side of tuner shield. Low side to chassis.	45MC (10MC Swp)	41.25MC	"	USE VTVM. DC probe to point Ⓑ. Common to chassis. Connect scope as in step 6.	A1, A3	Retouch for 1.0 to 1.5 volts on VTVM while maintaining response similar to Fig. 4 or Fig. 5.
9.	Fig. 6	Across antenna terminals thru matching network (Fig. 6).	Each VHF Channel in turn	42.5MC 45.75MC 47.25MC	All VHF Channels	Vert. Amp. thru 10K to point Ⓑ. Low side to chassis.	A1, A2	Retouch A1 and A2 SLIGHTLY to correct for tilt or other condition that is approximately the same on all channels.

SOUND IF ALIGNMENT

Connect the negative lead of a 10 volt bias supply to point Ⓐ. Positive to chassis.
Set Contrast Control fully clockwise.
Set VTVM for negative voltage readings.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
10.	.001mfd	High side to point Ⓑ. Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe thru diode detector (Fig. 7) to pin 7 (grid 3) of 6DT6 (V6). Common to chassis.	A7, A8, A9	Adjust for maximum negative DC on meter. Attenuate generator for a reading between 1 and 1.5 volts on meter when finally peaked. Peak A7 and A8 with maximum core separation. Adjust A9 for maximum.
11.	Remove VTVM and diode detector. Connect scope across volume control. Turn off signal generator and tune in the strongest signal in the area adjusting volume control for normal volume. Preset coil slug A10 flush with top of coil form. While observing scope and listening to sound output adjust A10 clockwise to a peak. Continue turning clockwise to a second louder peak and adjust for maximum on this second peak.						

ALIGNMENT INSTRUCTIONS (cont)

ALTERNATE SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR

Connect the negative lead of a 10 volt bias supply to point Ⓐ . Positive to chassis.
Set Contrast Control fully clockwise.
Set VTVM for negative voltage readings.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
10.	.001mfd	High side to point Ⓑ . Low side to chassis.	4.5MC (400∿ FM Mod. 15KC Swp)	Any non-interfering channel	DC probe thru diode detector (Fig. 7) to pin 7 (grid 3) of 6DT6 (V6). Common to chassis.	A7, A8, A9	Adjust for maximum negative DC on meter. Attenuate generator output for a reading between 1 and 1.5 volts on meter when finally peaked. Peak A7 and A8 with maximum core separation. Adjust A9 for maximum.
11.	"	"	"	"	USE SCOPE. Connect across volume control.	A10	Adjust for maximum 400∿ indication on scope. Adjust volume control for .7 volt peak to peak on scope when peaked.
12.	"	"	"	"	"		Decrease input signal to MINIMUM usable level and retouch A7, A8 and A9 for symmetrical breakout similar to Fig. 8.

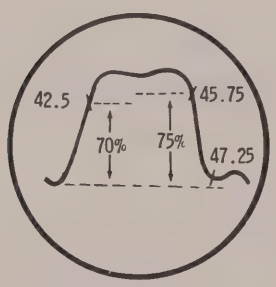


FIG.1

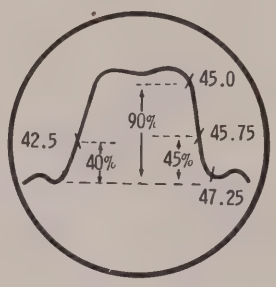


FIG.2

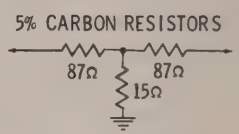


FIG.3

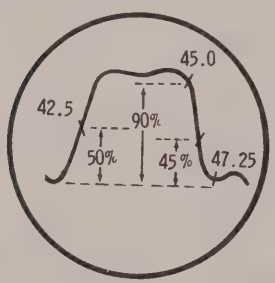


FIG.4

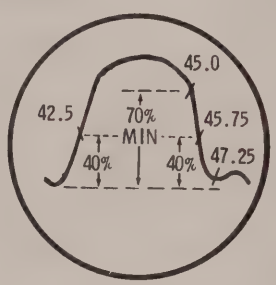


FIG.5

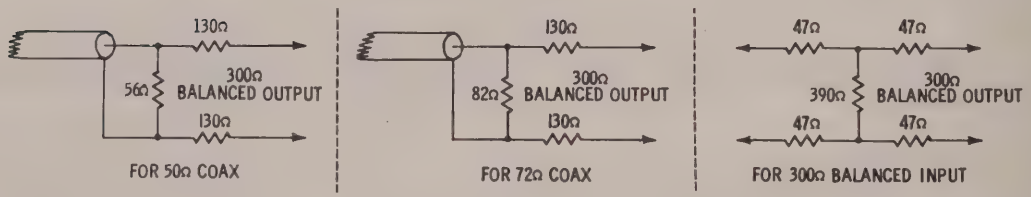


FIG.6

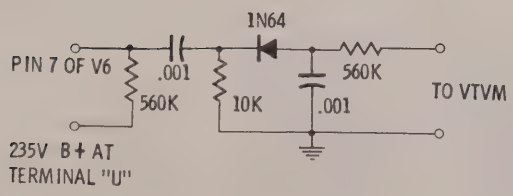


FIG.7

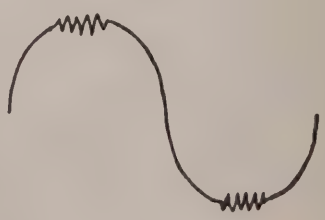
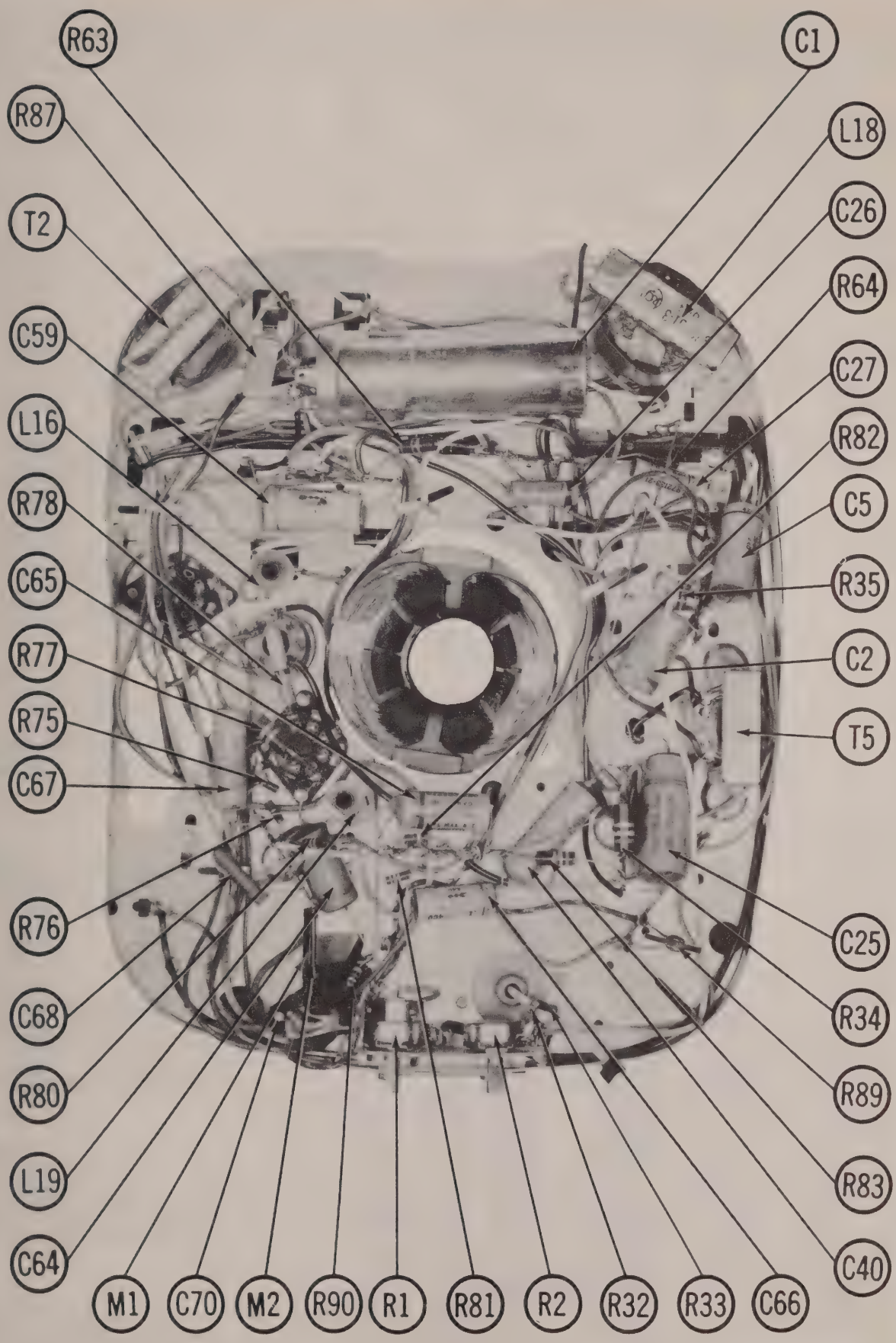


FIG. 8



CHASSIS FRONT VIEW

SET 460 FOLDER 1

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No	CBS / GENERAL ELECTRIC — USE	TYPE	ITEM No	RAYTHEON / SYLVANIA — USE	TYPE
V1	1st Video-IF Amp - Vert. Mult	6CU8	V7	Audio Output	6AQ5A
V2	2nd Video-IF Amp	6CB6	V8	Vert. Mult. - Vert. Output	6AQ5A
V3	3rd Video-IF Amp - Sync Amp.	6CU8	V9	Horiz. AFC-Horiz. Osc.	6CG7
V4	Video Output-Sync Sep	6AW8A	V10	Horiz. Output	21QR5A
V5	Sound IF Amp	6AL8	V11	Damper	6AX4GT
V6	Audio Det	6DT6	V12	HV Rect	1X2B
			V13	LV Rect	5AS4A

PICTURE TUBE

ITEM No	REPLACEMENT DATA: RCA Victor PART No.	GENERAL ELECTRIC PART No.	RCA PART No	RAYTHEON PART No.	SYLVANIA PART No.	NOTES
V14	14WP4 14ZP4		14WP4 14ZP4 1	14WP4	14WP4/ 14ZP4 ③	① Aluminized ② Silver Screen "85"

ELECTROLYTIC CAPACITORS

ITEM No	RATING: CAP	VOLT	REPLACEMENT DATA: RCA Victor PART No.	AEROVOX PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	40	350	103111	AFH4-56-80	D0473.5	FPJ33.85 UT150X30		TVLS-4610.8*	
B	40	350							
C	40	300							
D	20	50							

* Not normally in distributor's stock Available thru distributor on order to manufacturer

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP	VOLT	TOL	REPLACEMENT DATA: RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	33	200		P288N-33			CUB2P33	GEM-4133	2TM-P33	
C3	39000			BPD-04		DD-403	BYA0S4	GP-140	5HK-S40	
C4	470			BPD-00047		DD-471	BYAI0T47	B-347	5GA-T47	
C5	.47	200		P288N-47			CUB2P47	GEM-2047	2TM-P47	
C6	15-165			106150						
C7	470			77293		BPD-00047	DD-471	BYAI0T47	B-347	5GA-T47
C8	18		NPO 5%	103153			TCZ-18	C10Q18C	CNO-418	10TCC-Q18
C9	1000			103234A		BPD-001	DD-103	BYAI0D1	B-310	5HK-D10
C10	680			104135		BPD-00068	DD-681	BYAI0T68	B-368	5GA-T68
C11	4700			73473		BPD-0047	DD-472	BYAI0D47M	B-347	5HK-D47
C12	1000			77253		BPD-001	DD-103	BYAI0D1	B-310	5HK-D10
C13	470			104380		BPD-00047	DD-471	BYAI0T47	B-347	5GA-T47
C14	1000			77252		BPD-001	DD-102	BYAI0D1	B-310	5HK-D10
C15	1000			103254A		BPD-001	DD-103	BYAI0D1	B-310	5HK-D10
C16	4700			73473		BPD-0047	DD-472	BYAI0D47M	B-347	5HK-D47
C17	4700			73473		BPD-0047	DD-472	BYAI0D47M	B-347	5HK-D47
C18	7		±.5mmf	104177		NPO-DI 6 8	DTZ-6R8	C10V7C	CNO-568	10TCC-V68
C19	5		±.5mmf	104178		NPO-DI 5	TCZ-4R7	C10V5C	CNO-547	10TCC-V5
C20	.047	200		104201		P281N-047	DF-503	BC2S47J	ACE647	2SF-47
C21	9		±.5mmf	104211		NPO-DI 10	TCZ-10	C10V9C	CNO-410	10TCC-Q10
C22	1	400		104212		P481N-1	DF-104	BC5P1	ACE401	4SE-P10
C23	333	600		104213		P681N-033		BC6S33J	ACE633	6SE-S33
C24	18		NPO			NPO-DI 18	TCZ-18	C10Q18C	CNO-418	10TCC-Q18
C25	39	400	10%						GTM-404	
C26	.022	400				P488N-022		CUB4S22	GEM-4122	4TM-S22
C27	.047	300				P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47
C28	3	1000	±1mmf	104204				C0V3C	CNO-533	10TCC-V33
C29	680			104135		BPD-00068	DD-681	BYAI0T68	B-368	5GA-T68
C30	10000			73960		BPD-01	DD-103	BYAI0S1	B-110	5HK-S10
C31	3300		10%	104205		DI-3300		PME5D33	J1-233	10TS-D33
C32	10000			73960		BPD-01	DD-103	BYAI0S1	B-110	5HK-S10
C33	470			77293		BPD-00047	DD-471	BYAI0T47	B-347	5GA-T47
C34	10000			73960		BPD-01	DD-103	BYAI0S1	B-110	5HK-S10
C35	1500			104207		BPD-0015	DD-152	BYAI0D15	B-215	5HK-D15
C36	10000			73960		BPD-01	DD-103	BYAI0S1	B-110	5HK-S10
C37	10000			73960		BPD-01	DD-103	BYAI0S1	B-110	5HK-S10
C38	.047	200		P288N-047		DF-503	CUB2S47	GEM-4147	2TM-S47	
C39	3300		10%	104308		DI-3300		IR5D33	J1-233	10TS-D33
C40	.068	600			DD16-702	P688N-068		CUB6S68	GEM-4168	6TM-S68
C41	10000			73960		BPD-01	DD-103	BYAI0S1	B-110	5HK-S10
C42	47		10%	102882		DI-47	DD-470	LI0Q47	GP-447	10TS-Q47
C43	.01	400	10%			V94C4SI-10%		PM4S1	GTM-411	4TM-S1
C44	3900		10%	104325		DI-3900		IR5D39	J1-239	10TS-D39
C45	.0047	600	10%			V94C5D47-10%		PM5D47	GTM-5247	5TM-D47
C46	47		10%	103803		DI-47	DD-470	LI0Q47	GP-447	10TS-Q47
C47	470			77293		BPD-00047	DD-471	BYAI0T47	B-347	5GA-T47
C48	.033	600	10%			V94C5S33-10%		PM5S33	GTM-5133	5TM-S33
C49	.022	400				P488N-022		CUB4S22	GEM-4122	4TM-S22
C50	.056	600	10%	104221		P684CM-057		PM6S6	GTM-2156	6TM-S6
C51	.033	600				P688N-033		CUB6S33	GEM-6133	6TM-S33
C52	2200		10%	104886		DI-2200		PM5D22	GP-222	10TS-D22
C53	.015	300	10%			V94C2S5-10%		PM4S5	GTM-3155	4TM-S5
C54	.027	600	10%	140230		P684CM-027		PM6S3		6TM-S3
C55	1000	2000	10%	104222						
C56	62		5%	104214			TCZ-62	C10Q62C	CNO-462	10TCC-Q62
C57	68		5%	104234			TCZ-68	C10Q68C	CNO-468	10TCC-Q68
C58	.022	400		104223		P481N-022		BC6S22J	ACE622	4SE-S22
C59	.47	200				P288N-47		CUB2P47	GEM-2047	2TM-P47
C60	330	1000	5%	104235		1466-S1Y-330-5%				
C61	.01	600	10%	104227		V94C6S-10%		PM6S1	ACE611	6SE-S10
C62	1000		5%	104226		1466-001J		1R5D1	MDJ454	MS-J1
C63	1000		5%	104236		1466-001K	DD-102	1R5D1	MDJ454	MS-J1
C64	.1	600				P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1
C65	.1	400				P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1
C66	.1	400				P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1
C67	.039	600	10%			P684CM-039		PM6S4	GTM-614	6TM-S4
C68	139	3500	10%	78533		SE-58	DS-560	C10Q56C	UC-5456	5GA-Q56
C69	56					V84C5647-10%		PM5S47	GTM-5147	5TM-S47
C70	.047	500	10%							

① Some versions may use 1000mmf in this application (Part #102234A).
② Some versions may use 1000mmf in this application (Part #77252)

CONTROLS

ITEM No	RATING: RESIST ANCE	WATTS	REPLACEMENT DATA: RCA Victor PART No	CENTRALAB PART No	CLAROSTAT PART No	IRC PART No	MALLORY PART No	INSTALLATION NOTES
R1A	1meg	1	104195	B-70-S	A47-1meg-Z	Q13-137	TA10A	Volume
B	Shaft			Not Req.	F2-3	Not Req.	Not Req.	
C	Switch			Not Req.	SWF-12	70-1	US-35	Power Off-On
R2	3000Ω		104484	B-705		Q17-112	U9	Contrast
R3A	1.5meg		104203					Vert. Hold
B	1.5meg							Vert. Lin.
R4A	5meg		104202					Height
B	200K							Brightness

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS	ITEM No.	RATING	REMARKS	ITEM No.	RATING	REMARKS
R5	270Ω		R34	56K 2W		R63	150Ω 1W	
R6	22K 2W		R35	1 Meg		R64	22K	
R7	18K 1W		R36	100K		R65	1.5meg	
R8	47K 5%		R37	10K 1W		R66	150K 5%	
R9	220Ω		R38	1000Ω		R67	82K 5%	
R10	1000Ω		R39	15K 2W		R68	100K 5% 1W	
R11	680Ω		R40	82Ω		R69	330K	
R12	5600Ω		R41	560K		R70	47K 1W	
R13	68K		R42	470K		R71	47K	
R14	150K 5%		R43	560Ω		R72	3900Ω	
R15	47Ω 5%		R44	8.2meg		R73	1meg	
R16	680Ω		R45	680K		R74	100K	
R17	150K 5%		R46	1meg		R75	47Ω	
R18	33Ω 5%		R47	18K		R76	10meg	
R19	8200Ω 10W		R48	22K 1W		R77	15K 2W	
R20	180Ω		R49	56000Ω 5%		R78	27Ω 2W	
R21	1000Ω		R50	27K 2W		R79	20Ω Fusible	#104396
R22	39000Ω 5%		R51	22K		R80	68K	
R23	560K		R52	18K		R81	270K	
R24	820K		R53	6.8meg		R82	100K	
R25	680K		R54	220K		R83	56K 1W	
R26	68K		R55	1.5meg		R84	10000Ω	
R27	18K 5%		R56	32K		R85	150Ω	
R28	5000Ω 5W	#104490	R57	15K		R86	150Ω	
R29	330Ω		R58	18K 5%		R87	2200Ω 4W	
R30	180K		R59	330K		R88	68Ω 1W	
R31	150K		R60	10K		R89	120Ω Cold	#107191
R32	820Ω		R61	1.5meg		R90	820K	
R33	2700Ω		R62	18K 5% 1W		R91	33K	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	RCA Victor PART No.	REPLACEMENT DATA
K1	Sound IF Grid	56mmf, 47K	104329	Centralab BC-421 - Sprague PRC-1
K2	Sync Coupling	330mmf, 330mmf, 270K, 1meg, 2 2meg	104330	Centralab PC-338 Sprague ST-12

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA: RCA Victor PART No	Gromer PART No	Meissner PART No.	Merit PART No.	Miller PART No	Ram PART No	NOTES
L1	47.25MC Trap	104141						
L2	RF Choke							
L3	1st Video IF	104232						
L4	2nd Video IF	104233						
L5	3rd Video IF	104234						
L6	Fil. Choke	73477	19-1000	19-1000	BC-561	4602		1uh
L7	RF Choke							
L8	4th Video IF	104233						
L9	Series Peaking Coil	101819	19-3036	19-3036	TV-180	6176	VP-1	36uh
L10	Shunt Peaking Coil	104229	19-3125	19-3125	TV-195	6153	VP-4	120uh
L11	Shunt Peaking Coil	104230	19-3300	19-3300	TV-199	6155		300uh
L12	Series Peaking Coil	105456	19-3125	19-3125	TV-195	6153	VP-4	120uh
L13	1st Sound IF	104316						①
L14	2nd Sound IF	104137						②
L15	Quadrature Coil	105795						③

① Includes 39mmf cap. ② Includes two 12mmf caps. ③ Includes 10mmf cap. & 130K resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES: PRI.	SEC.	REPLACEMENT DATA: RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No	NOTES
L16	96Ω		103570	HS-7	TV-185			HS-7	Horiz. Osc. tapped ① 68Ω
L17	45Ω		102195						Horiz. Waveform

FILTER CHOKE

ITEM No.	RATINGS: CURRENT (Measured)	DC RES.	INDUCTANCE @ CURRENT 1000 ~/s	REPLACEMENT DATA: RCA Victor PART No	Halldorson PART No	Merit PART No	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No
L18	220A	48Ω	.9 Hy.	100288						C-26X

COILS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA: RCA Victor PART No	Halldorson PART No	Merit PART No	Miller PART No	Ram PART No	Rogers PART No	Stancor PART No	Thordarson PART No	Triad PART No
L19	Width (1.6-11MH)	104088	WC-22	MWC-91	6322	20IU5	QRC100	WC-6	WC-22	WLC-6

① Do not use tap.

TRANSFORMER (POWER)

ITEM No	RATING: PRI.	SEC. 1	SEC. 2	REPLACEMENT DATA: RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No
T1	117V ⓐ 1.4A	680VCT ⓑ 220A	5V ⓒ 3A	106668						R-75BA
	SEC. 3	SEC. 4	SEC. 5							
	6.3V ⓐ 7.2A									

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	Vert. Output	104192	26S19		V38 ①		VO-103	26S19	A-115Z
T3	Yoke-Horiz (18 6MH) (90°)-Vert. (11.3MH) Centering Magnet	104369	Y-50				DY-24A ②	Y-50	T-49 & WW-23
	Yoke Clamp	104368							
T4	Horiz. Output	102396 106189	FLY-100 *	HVO-137*	X168 *		HO-280 *	FLY-100*	D-139 *

① Drill new mounting hole(s). ② Use original rear cover and centering device.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	Ram Replacement Connections	Rogers Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
5	5	5	5		5	5	5
4	4	4	4		4	4	4
3	3	3	3		3	3	3
2	2	2	2		2	2	2
1	1	1	1		1	1	1
Connect Width Coil Across	2 & 1	2 & 1	2 & 1		2 & 1	2 & 1	2 & 1

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE: PRI.	SEC.	REPLACEMENT DATA: RCA Victor PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T5	7500Ω	3-4Ω	104193	24S52	A-3931	AU-503	A-3878	24S52	S-7X	

SPEAKER

ITEM No	TYPE: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: RCA Victor PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	104478	4A07	

FUSES

ITEM No	TYPE	RATING	REPLACEMENT DATA: RCA Victor PART No: FUSE	HOLDER	LITTELFUSE PART No: FUSE	HOLDER	BUSS PART No: FUSE	HOLDER
M1	2½" Length #28 Wire							
M2	2½" Length #28 Wire							

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA: RCA Victor PART No	CBS PART No	RAYTHEON PART No	SYLVANIA PART No	NOTES
M3		76675B	1N60	1N60	1N295	Video Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M4	Tuner	107193	VHF (KRK85A) Ch. KCS120F
	Tuner	107227	VHF with UHF provisions (KRK86A) Ch. KCS120F
	Tuner	106686	UHF (KRK86B) (Less Gears) Ch. KCS120F

RCA VICTOR MODELS 140P012, U, 140P020, U, 140P023, U, 140P024, U (Ch. KCS120E, F)

FOLDER 1

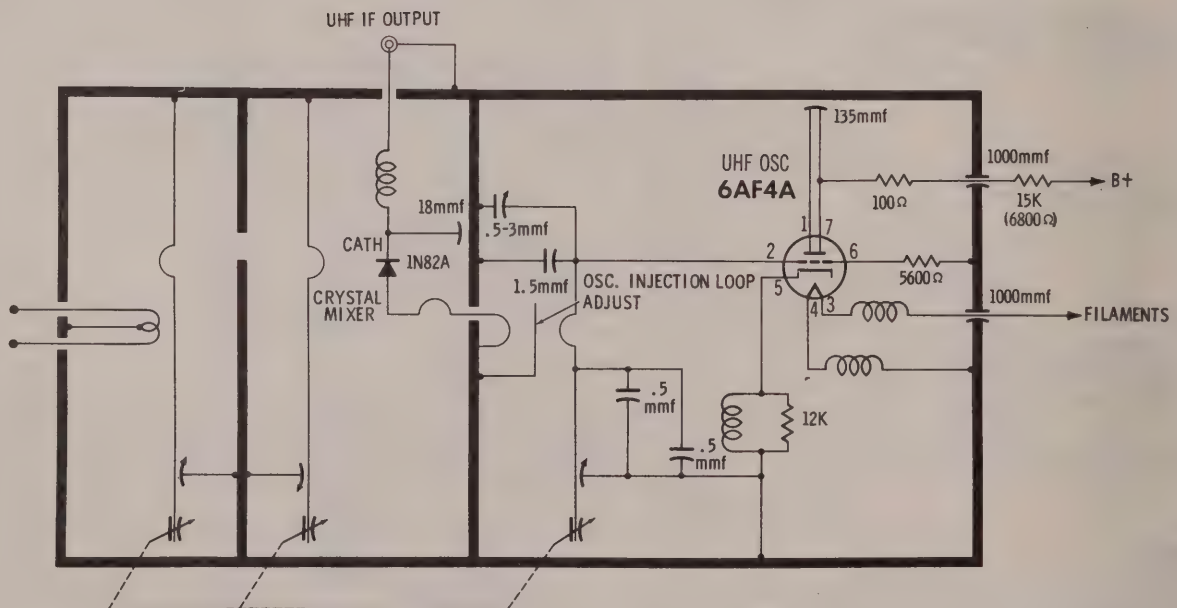
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Safety Glass	107174	
Mask	104340	
Knob	104343	VHF Channel Selector, Models 140P023, 1040P012
Knob	104344	VHF Channel Selector, Model 140P020
Knob	104345A	VHF Channel Selector, Model 140P024
Knob	104346	VHF Channel Selector, with UHF markings, Models 140P023U, 140P012U
Knob	104347	VHF Channel Selector, with UHF markings, Model 140P020U
Knob	104348A	VHF Channel Selector, with UHF markings, Model 140P024U
Knob	103069	UHF Channel Selector, Models 140P023U, 140P012U
Knob	104352	UHF Channel Selector, Model 140P020U
Knob	103068	UHF Channel Selector, Model 140P024U
Knob	104349	Fine Tuning, Models 140P023, U, 140P012, U
Knob	104350	Fine Tuning, Models 140P020, U
Knob	104351	Fine Tuning, Models 140P024, U
Knob	106141	UHF Dial, Models 140P023U, 140P012U
Knob	106301	UHF Dial, Model 140P020U
Knob	106140	UHF Dial, Model 140P024U
Knob	103078	Volume, Contrast, Models 140P023, U, 140P012, U
Knob	104342	Volume, Contrast, Models 140P020, U
Knob	103077	Volume, Contrast, Models 140P024, U
Handle	106134	
Antenna	104458	UHF Loop

WIRING DATA

High Voltage Lead	Use BELDEN No. 8869
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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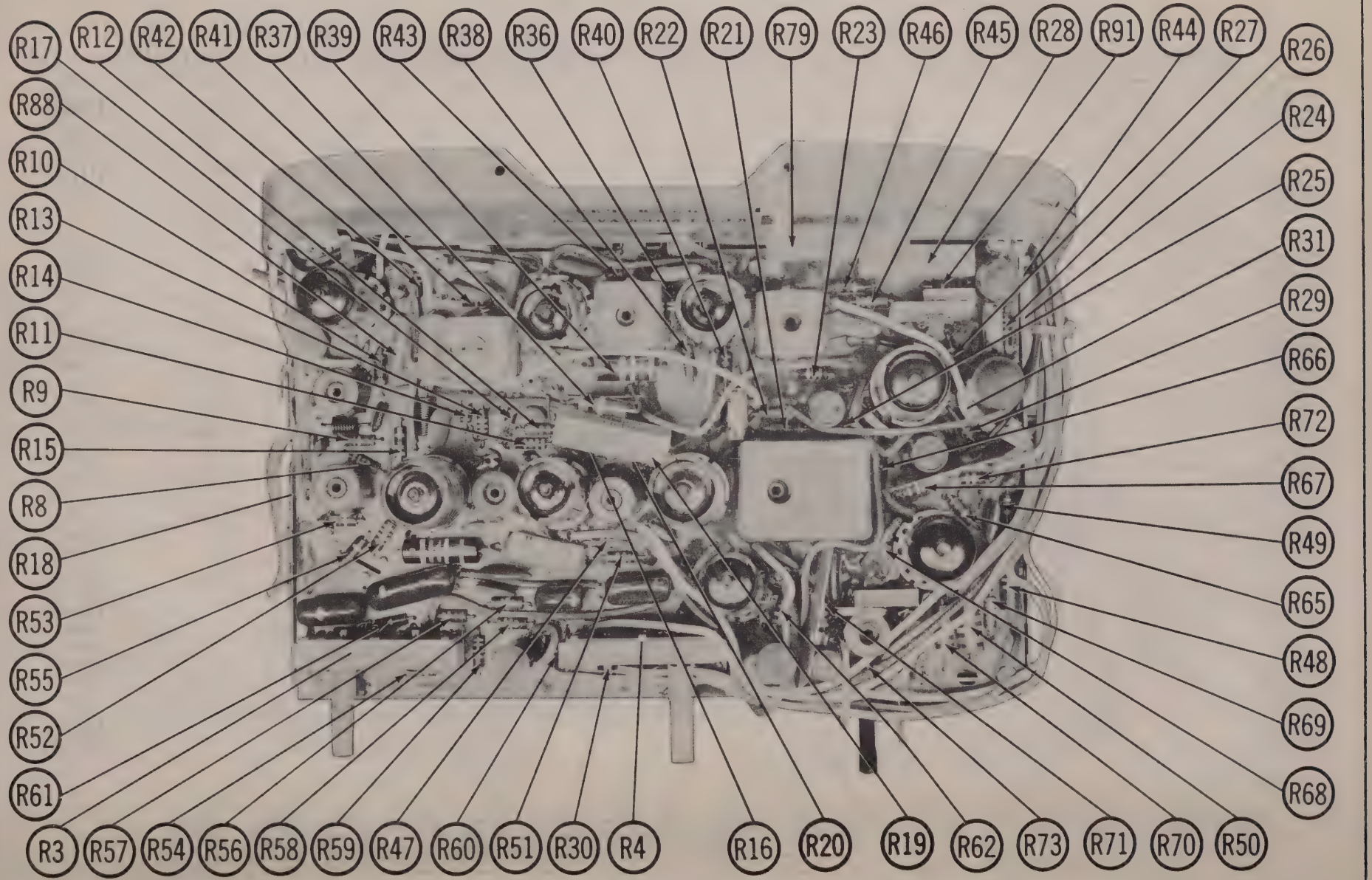
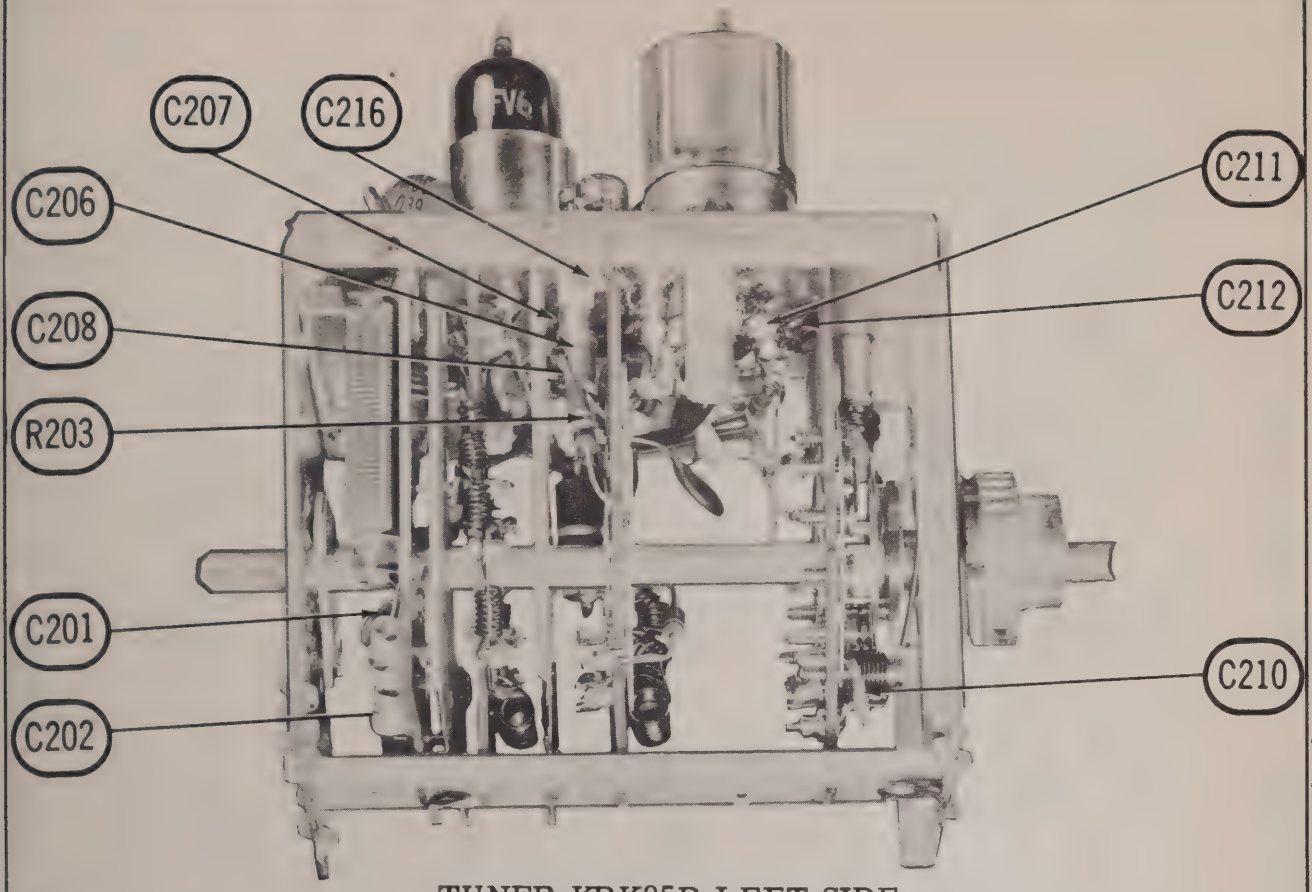
UHF TUNER 962047 (KRK 66H)

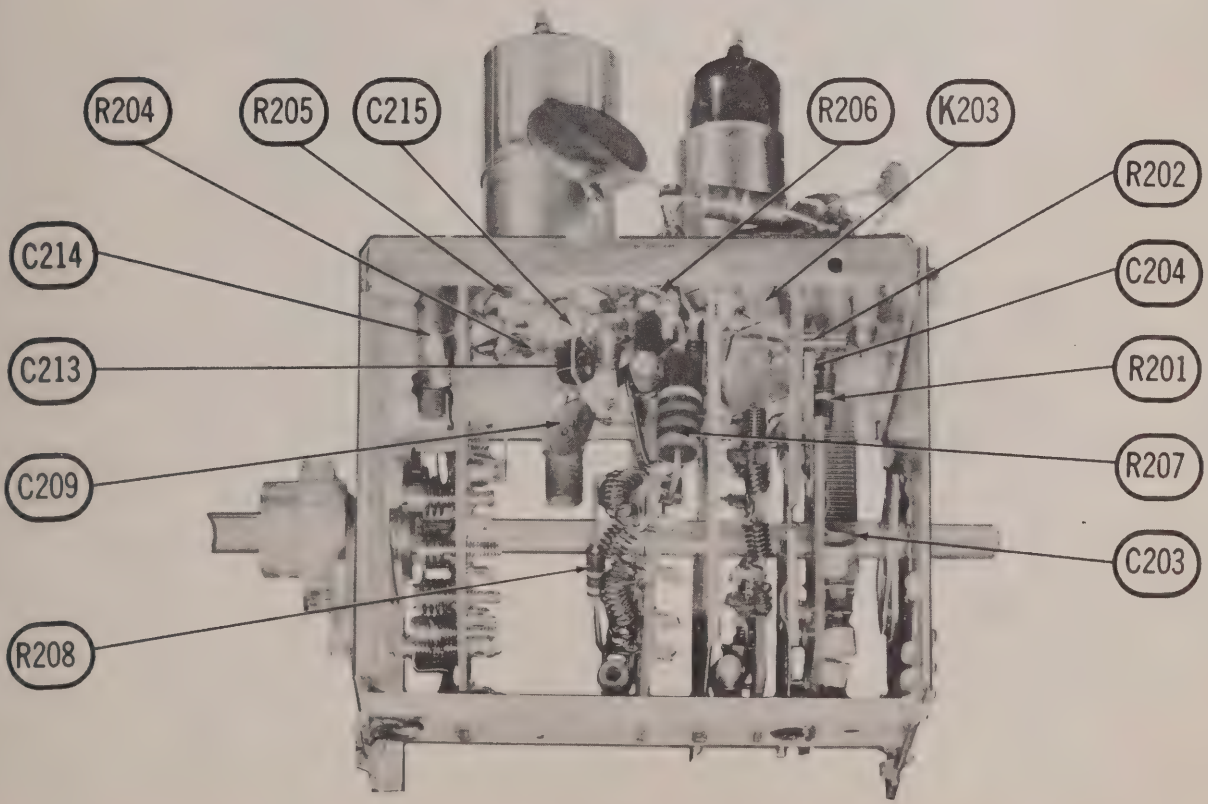
PRINTED BOARD – CAPACITOR IDENTIFICATION



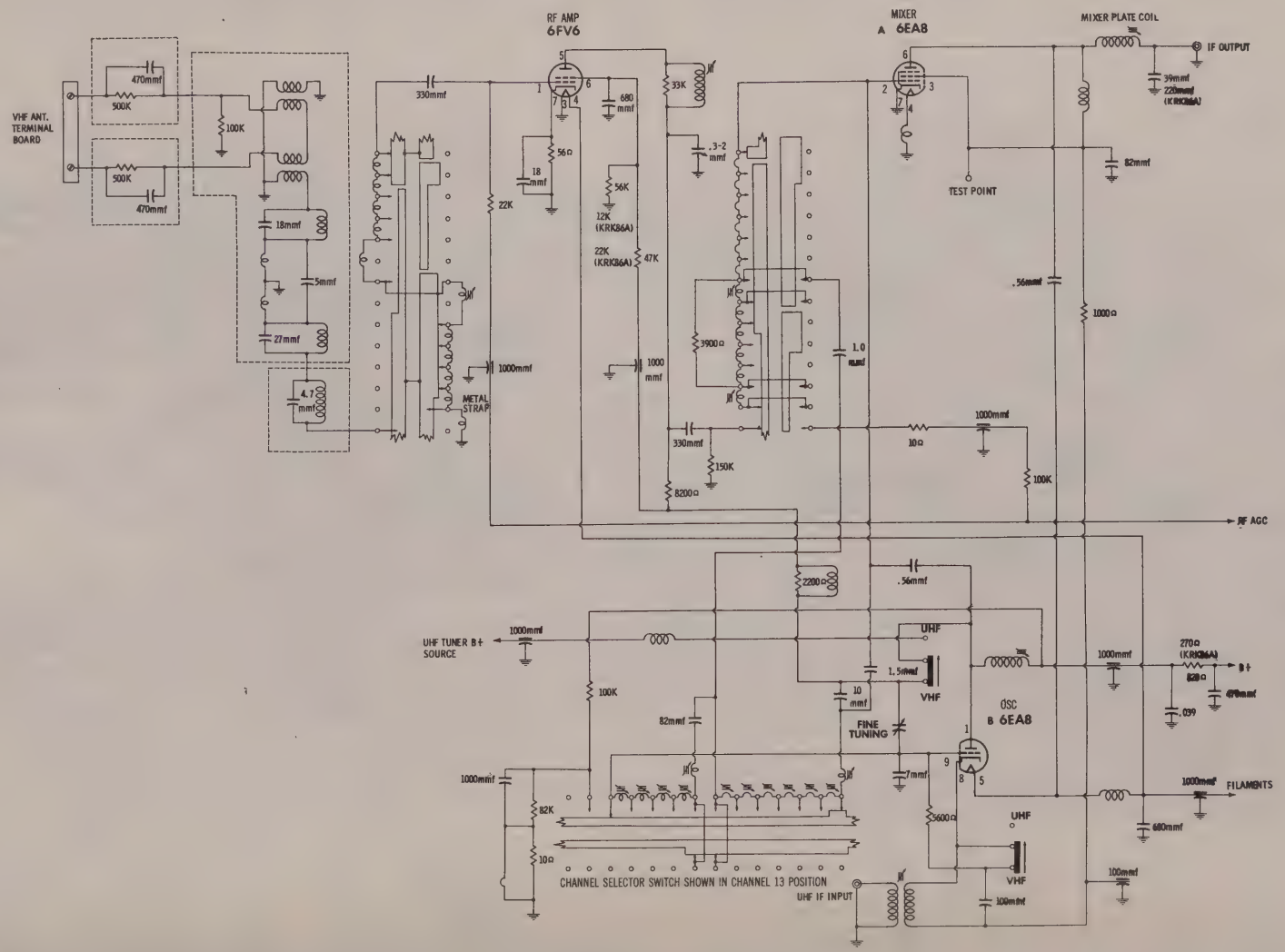
PRINTED BOARD - RESISTOR IDENTIFICATION



TUNER KRK85B LEFT SIDE



TUNER KRK85B RIGHT SIDE



VHF TUNER with UHF Provisions KRK86A, B

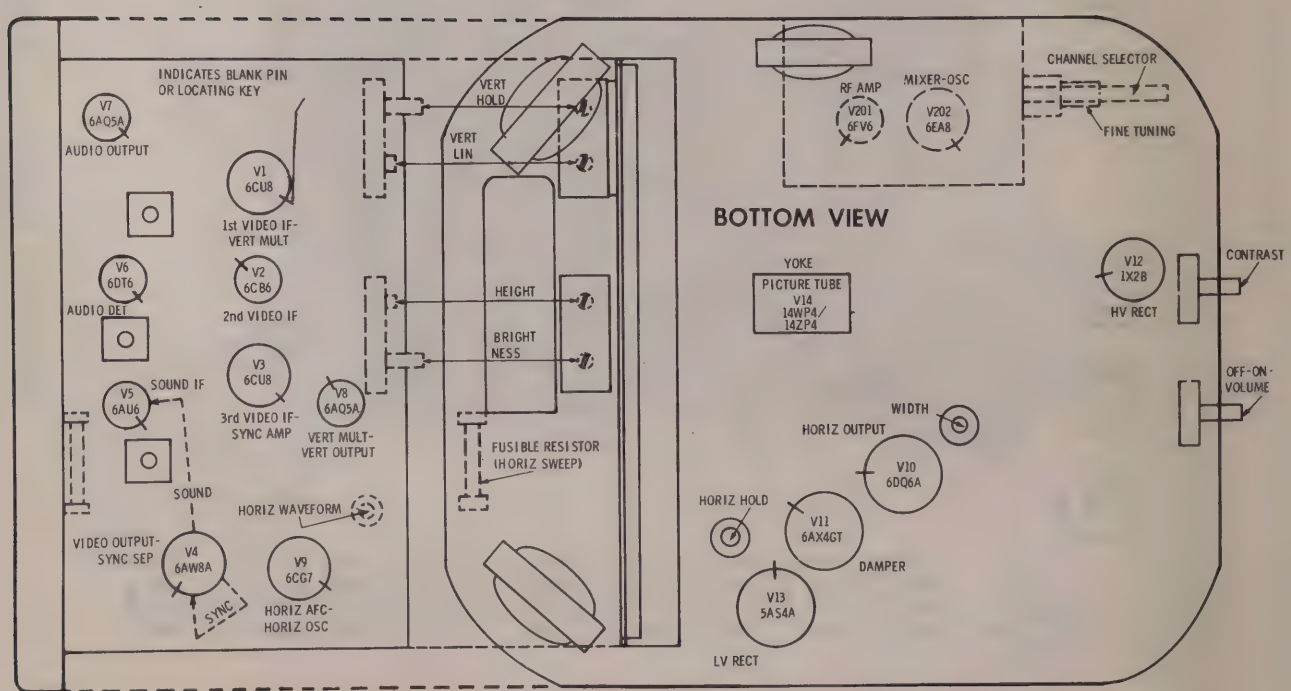
PRINTED BOARD - ALIGNMENT & INDUCTOR IDENTIFICATION

RESISTANCE MEASUREMENTS

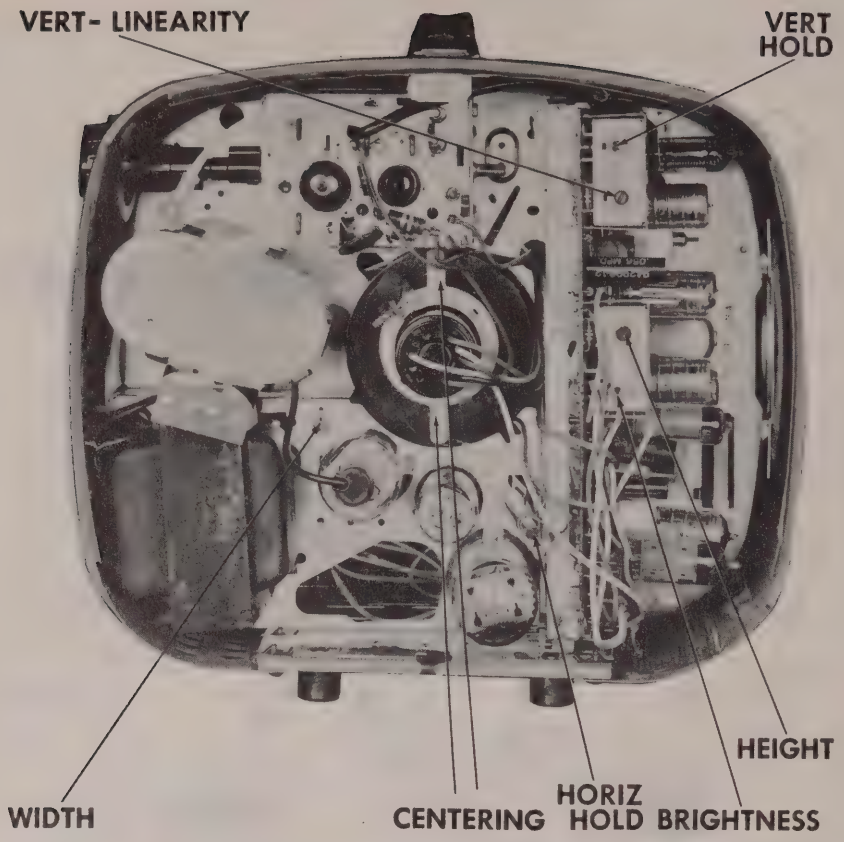
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6CU8	0Ω	▲ 680Ω	▲ 70K	.1Ω	0Ω	47Ω	565K	● 3meg	●†2.7meg
V2	6CB6	80K	▲ 33Ω	.1Ω	0Ω	†680Ω	†680Ω	80K		
V3	6CU8	0Ω	†8200Ω	†8200Ω	0Ω	.1Ω	180Ω	.1Ω	18K	†20K
V4	6AW8A	0Ω	3.2meg	†680K	.1Ω	0Ω	●370Ω	680K	†56K	†5100Ω
V5	6AU6	47K	0Ω	.1Ω	0Ω	†10K	†16K	82Ω		
V6	6DT6	4.2Ω	560Ω	.1Ω	0Ω	†730K	†15K	470K		
V7	6AQ5A	0Ω	680Ω	.1Ω	0Ω	†2500Ω	2200Ω	0Ω		
V8	6AQ5A	●1.7meg	0Ω	0Ω	.1Ω	†550Ω	†170Ω	● 1.7meg		
V9	6CG7	†0Ω	1.3meg	230K	0Ω	.1Ω	†47K	250K	0Ω	0Ω
V10	6DQ6A	NC	0Ω	NC	†15K	1meg	TP	.1Ω	27Ω	TOP CAP †18Ω
V11	6AX4GT	NC	NC	¶600K	NC	†20Ω	NC	.1Ω	0Ω	
V12	1X2B	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP †340Ω
V13	5AS4A	NC	¶	NC	50Ω	NC	47Ω	NC	¶	
V14	14WP4/ 14ZP4	0Ω	22K	Pin 6 †0Ω	Pin 10 †340K	Pin 11 220K	Pin 12 .1Ω			
V201	6FV6	650K	0Ω	0Ω	.1Ω	†8500Ω	†14K	56Ω		
V202	6EA8	†2500Ω	150K	INF	0Ω	.1Ω	INF	0Ω	INF	INF
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
▲ MEASURED FROM PIN 7 OF V2.
† MEASURED FROM 245V SOURCE.
ǂ MEASURED FROM PIN 3 OF V11.

NC NO CONNECTION
TP TIE POINT



TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Tune in a TV signal, preferably with a test pattern.

Adjust the Width slug (B1) for a picture SLIGHTLY wider than necessary to fill the picture mask.

Connect the vertical amplifier of a scope thru a low capacity probe to point Ⓒ. Low side to chassis. Adjust Waveform slug (B2) for waveform similar to Fig. 9 with round and sharp peaks at equal amplitudes.

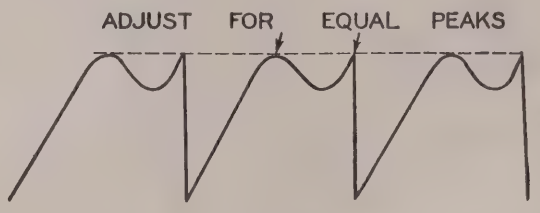


FIG.9

PHOTOFACT* Folder

EIA

TRUETONE MODELS 2DC1000B, 2DC1002

IMPORTANT FILING NOTICE

The TV Folder for this envelope will be found among the first folders in this complete Set of folders.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

TRUETONE MODELS
2DC1000B, 2DC1002

MODEL 2DC1000

TRUETONE MODELS
2DC1000B, 2DC1002

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

DATE 10–59

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

TRUETONE MODELS 2DC1000B, 2DC1002

TRUETONE MODELS 2DC1000B, 2DC1002

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL MODEL 2DC1000

1. Remove 11 wood screws holding rear cover. Remove antenna leads. Remove rear cover.
2. Remove 6 push-on type knobs from front of cabinet.
3. Remove speaker leads, yoke plug, picture tube socket, and HV lead.
4. Remove 4 metal screws holding the front control mounting bracket.
5. Remove chassis bolts from the bottom.
6. Remove chassis.

MODEL 2DC1000

TRADE NAME	Truetone Models 2DC1000, 2DC1002
SUPPLIER	Western Auto Supply Co., 2107 Grand Avenue, Kansas City, Mo.
TYPE SET	Television Receiver
TUBES	VHF-Sixteen, UHF-Seventeen
POWER SUPPLY	110-120 Volts AC, 60 Cycle RATING 180 Watts, 1.7 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

SERVICING IN THE FIELD

SAFETY GLASS REMOVAL

For picture tube, and safety glass cleaning, it is necessary to remove the chassis. (See "Disassembly Instructions".)

FUSE

One fuse is used for low voltage power supply protection. (For location, see "Tube Placement Chart".)

TUNER OSCILLATOR ADJUSTMENTS

To touch-up the VHF Oscillator, remove plug in the upper right side of cabinet.

AGC

The AGC may be varied by means of an AGC control. (For location, see "Tube Placement Chart".)

FOCUS

The focus may be varied by connecting the lead from pin 4 of the picture tube to various voltage points. (For location, see photo "Cabinet-Rear View".)

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

The Horizontal Frequency slug is used for the Horizontal Hold. (For location, see "Tube Placement Chart".)

CENTERING

Centering is accomplished by 2 magnetic rings, located behind the yoke, on the neck of the picture tube.

TRUETONE MODELS 2DC1000B, 2DC1002

SET 460 FOLDER 2

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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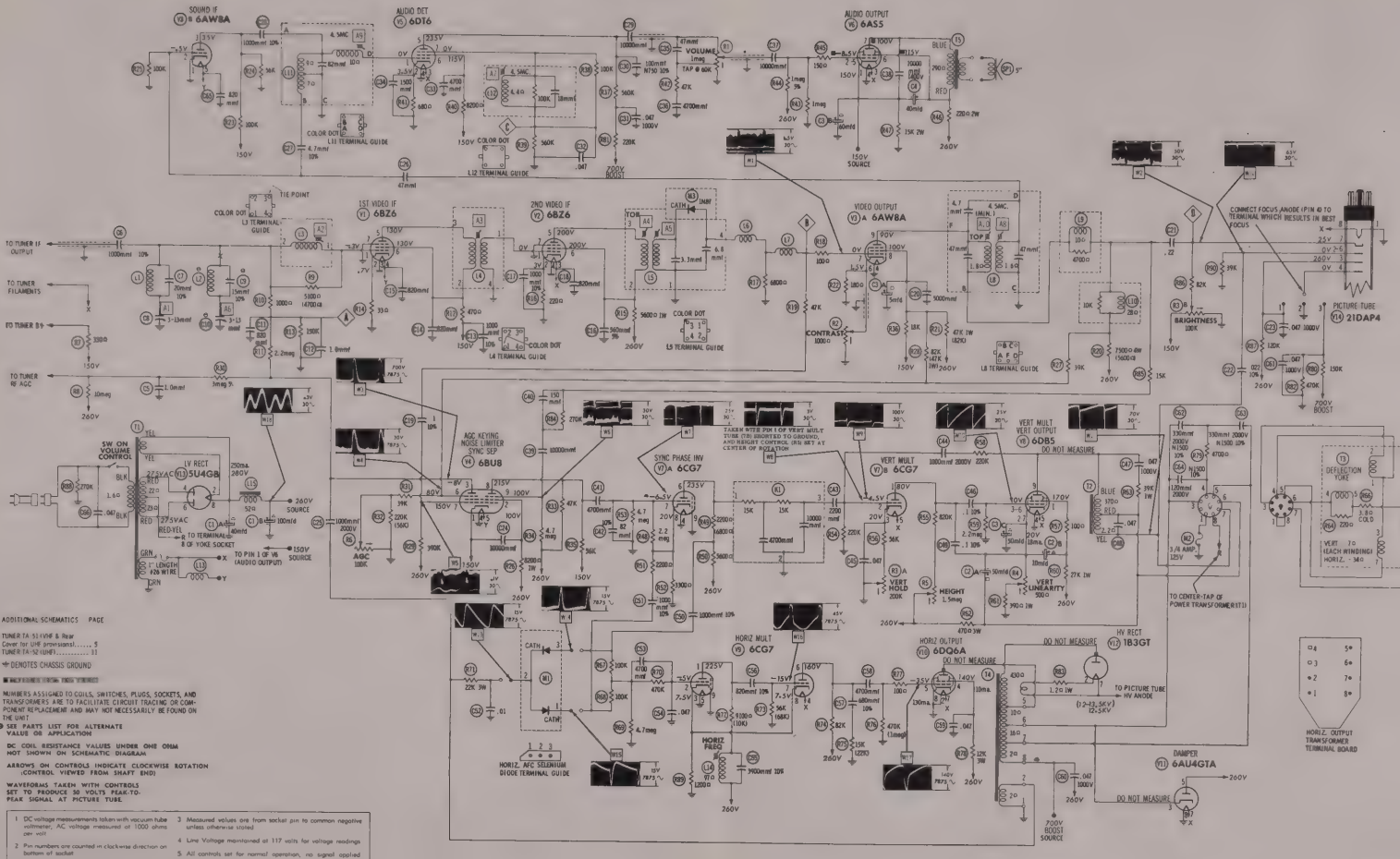
JA541


SOUND IF V3 = 6AW8A
AUDIO DET V5 6DT6
AUDIO OUTPUT V6 6AS5
VOLUME
TAP @ 60K
COLOR DOT
L11 TERMINAL GUIDE
L12 TERMINAL GUIDE
150V SOURCE
260V
700V BOOST
TIE POINT
L3 TERMINAL GUIDE
1ST VIDEO IF V1 6BZ6
2ND VIDEO IF V2 6BZ6
TOR
CATH
L4 TERMINAL GUIDE
L5 TERMINAL GUIDE
VIDEO OUTPUT V3 A 6AW8A
CONTRAST
L8 TERMINAL GUIDE
CONNECT FOCUS ANODE (PIN 4) TO TERMINAL WHICH RESULTS IN BEST FOCUS
PICTURE TUBE V14 21DAP4
BRIGHTNESS
TO TUNER IF OUTPUT
TO TUNER FILAMENTS
TO TUNER B+
TO TUNER RF AGC
SW ON VOLUME CONTROL
LV RECT V13 5U4GB
275VAC RED-RED
375VAC RED-YEL
TO TERMINAL 6 OF 8 CP YOKE SOCKET
TO PIN 1 OF V6 (AUDIO OUTPUT)
AGC KEYING NOISE LIMITER SYNC SEP V4 6BU8
AGC
SYNC PHASE INV V7 A 6CG7
TAKEN WITH PIN 1 OF VERT MULT TUBE (V8) GROUNDED TO GROUND, AND HEIGHT CONTROL (R5) SET AT CENTER OF ROTATION
VERT MULT V7 B 6CG7
VERT OUTPUT V8 6DB5
DO NOT MEASURE
VERT HOLD
HEIGHT
VERT LINEARITY
DEFLECTION YOKE
VERT TO (EACH WINDING) HORIZ. - 340
TO CENTER-TAP OF POWER TRANSFORMER (T1)
3/4 AMP 125V
HORIZ MULT V9 6CG7
HORIZ OUTPUT V10 6DQ6A
HV RECT V12 1B3GT
TO PICTURE TUBE — HV ANODE
(12-13.5KV) (0-5KV)
HORIZ. OUTPUT TRANSFORMER TERMINAL BOARD
HORIZ. AFC SELENIUM DIODE TERMINAL GUIDE
HORIZ FREQ
DAMPER V11 6AU4GTA
700V BOOST SOURCE
ADDITIONAL SCHEMATICS PAGE
TUNER TA-51 VHF & Rear Cover for UHF provisions!..... 5
TUNER TA-52 (UHF)..... 11
* DENOTES CHASSIS GROUND
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT
● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
1 DC voltage measurements taken with vacuum tube voltmeter, AC voltage measured at 1000 ohms per volt
2 Pin numbers are counted in clockwise direction on bottom of socket
3 Measured values are from socket pin to common negative unless otherwise stated
4 Line Voltage maintained at 117 volts for voltage readings
5 All controls set for normal operation, no signal applied
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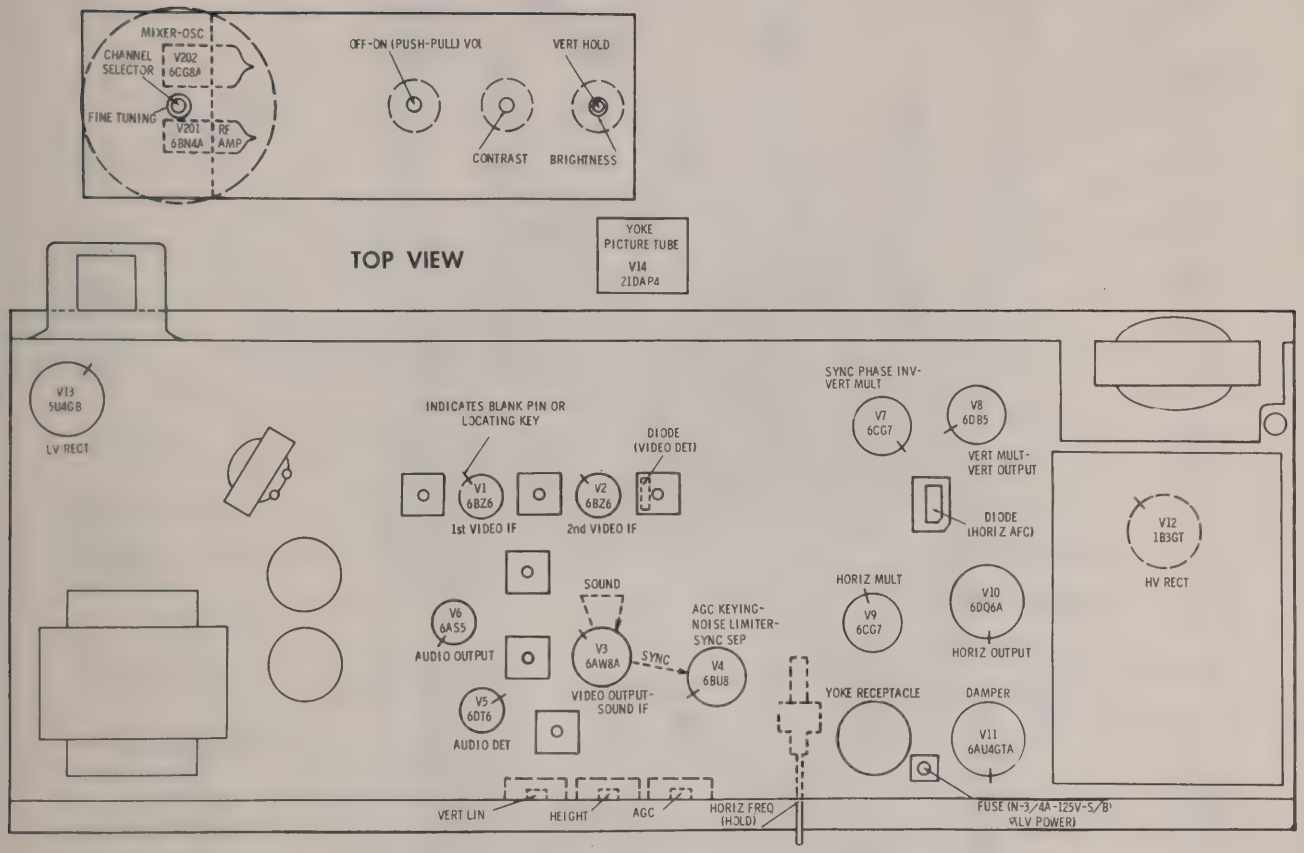
TRUETONE MODELS
2DC1000B, 2DC1002

TUBE PLACEMENT CHART



TRUETONE MODELS
2DC1000B, 2DC1002

TUBE FAILURE CHECK CHART

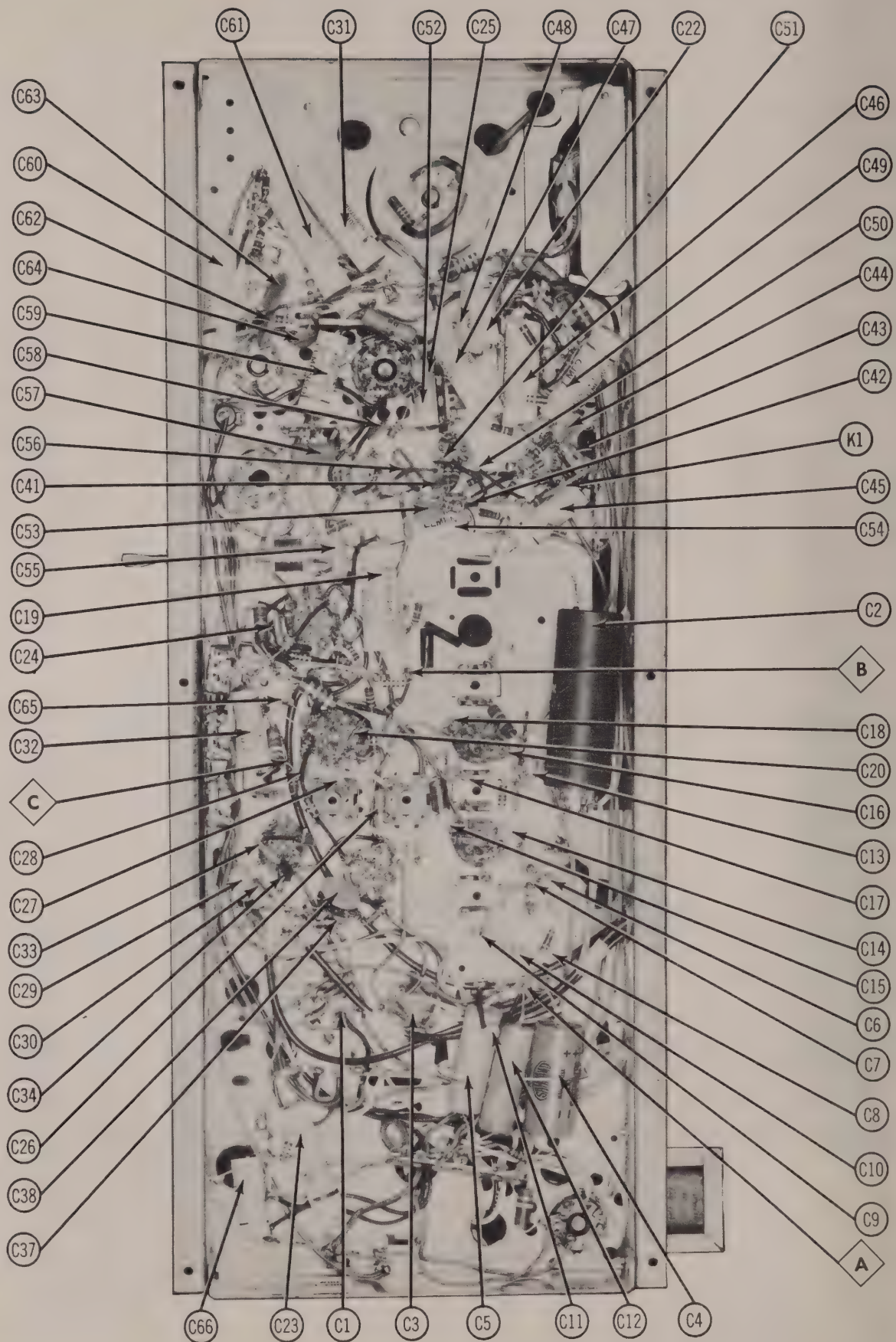
The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound — Fuse (LV Power), V13

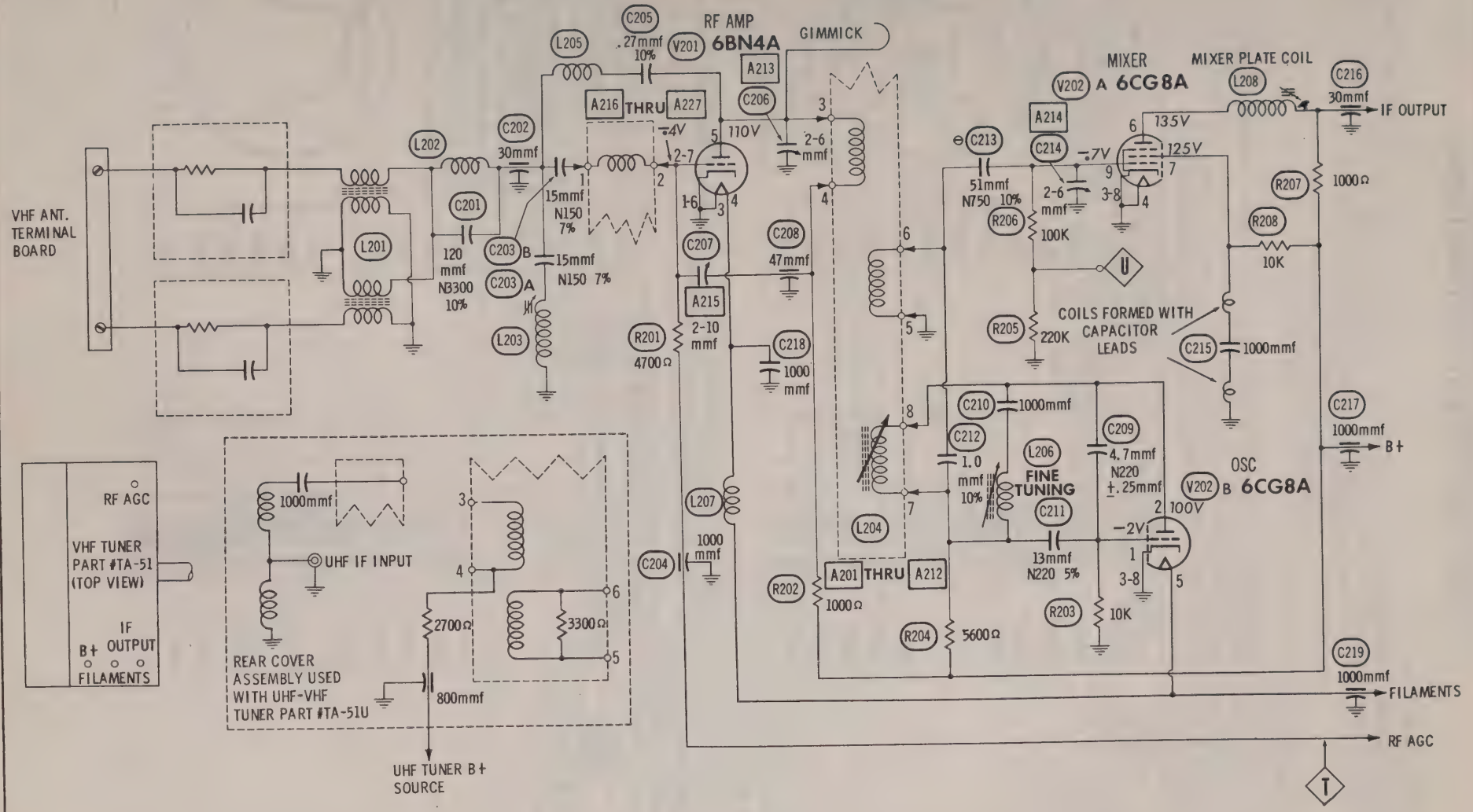
SWEEP FAILURE
No raster, has sound — V9, V10, V11, V12, V14, V13
No vertical deflection — V7, V8
Poor vert. linearity or foldover — V7, V8
Poor horiz. linearity or foldover — V9, V10, V11
Narrow picture — V13, V9, V10, V11
Vert. off freq. — V7, V8
Horiz. off freq. — Diode (Horiz. AFC), V9

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster — V1, V2, Diode (Video Det.), V3
No pic, no sound, has snow — V201, V202
No pic, has sound, has raster — V3, V14
Has pic, no sound — V3, V5, V6
Overloaded picture — V4

SYNC FAILURE
No vert. sync — V7
No horiz. sync — Diode (Horiz. AFC), V9
No vert. or horiz. sync — V4, V7



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION



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TUNER TA-51, U

TRUETONE MODELS 2DC1000B, 2DC1002

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: A201 thru A212 ..... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8987
WALSCO #2531
A213, A214, A215..... GENERAL CEMENT #5000, 5003, 8276, 8290
WALSCO #2512, 2525

VHF OSCILLATOR ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.
Set the Fine Tuning to the center of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 47K across Video Det. load.	A201	Adjust to place sound marker in trap notch as in Fig. 201. Video marker should fall at 50%.
			207MC	205.25MC 209.75MC	12		A202	
			201MC	199.25MC 203.75MC	11		A203	
			195MC	193.25MC 197.75MC	10		A204	
			189MC	187.25MC 191.75MC	9		A205	
			183MC	181.25MC 185.75MC	8		A206	
			177MC	175.25MC 179.75MC	7		A207	
			85MC	83.25MC 87.75MC	6		A208	
			79MC	77.25MC 81.75MC	5		A209	
			69MC	67.25MC 71.75MC	4		A210	
			63MC	61.25MC 65.75MC	3		A211	
			57MC	55.25MC 59.75MC	2		A212	

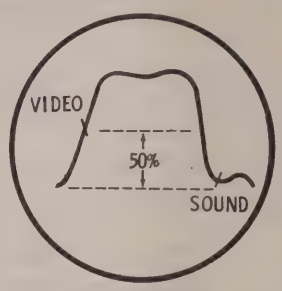


FIG. 201

VHF RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.
Connect the negative lead of a 4.5 volt bias supply to point (T). Positive to chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
2.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC	193.25MC 197.75MC	10	Vert. Amp. thru 10K to point (U). Low side to chassis.	A213, A214, A215	Adjust A213 and A214 for maximum amplitude and symmetry with markers as shown in Fig. 202. Increase bias for MINIMUM amplitude of response curve. Without changing the bias adjust A215 to obtain MINIMUM response on the scope. Restore bias.
3.	"	"	213MC	211.25MC 215.75MC	13	"	A216	Adjust for maximum amplitude of response similar to Fig. 202. Adjust by compressing or expanding coil turns.
			207MC	205.25MC 209.75MC	12		A217	
			201MC	199.25MC 203.75MC	11		A218	
			195MC	193.25MC 197.75MC	10		A219	
			189MC	187.25MC 191.75MC	9		A220	
			183MC	181.25MC 185.75MC	8		A221	
			177MC	175.25MC 179.75MC	7		A222	
			85MC	83.25MC 87.75MC	6		A223	
			79MC	77.25MC 81.75MC	5		A224	
			69MC	67.25MC 71.75MC	4		A225	
			63MC	61.25MC 65.75MC	3		A226	
			57MC	55.25MC 59.75MC	2		A227	

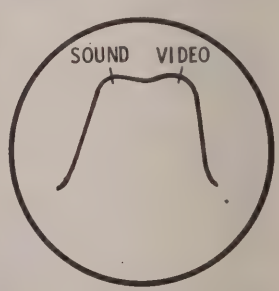


FIG. 202

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested Alignment Tools: A1 thru A9 ..... GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545
Mixer Plate Coil .... GENERAL CEMENT #9296, 9297
WALSCO #2546, 2547

VIDEO IF ALIGNMENT

Set Contrast fully clockwise.
Set AGC fully counterclockwise.
Connect the negative lead of a 3 volt bias supply to point (A). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	Place a thin insulated metal strip between the Mixer-Osc. tube (V202), and tube shield. Connect the high side of sweep generator to the metal strip. Low side to chassis.	44.0MC (10MC Swp)	41.25MC 42.25MC 45.75MC 47.25MC	Any non-interfering channel	Vert. Amp. thru 10K to point (B). Low side to chassis.	A1, A2, A3, A4, A5, A6, & Mixer Plate Coil	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. A1 places 41.25MC marker in trap notch, A2 and Mixer Plate Coil controls low frequency side of curve, A3 controls high frequency side, A4 controls tilt and A5 controls dip. Adjust A6 to place 47.25MC marker in proper trap notch.

SOUND IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
2.	.001mfd	High side to point (B). Low side to chassis. Use high output.	4.5MC (400∿ FM, 15KC Swp)	Any non-interfering channel	DC probe to point (C). Common to chassis. Connect scope across speaker voice coil.	A7	Adjust for maximum scope indication. If two peaks occur, select the peak which gives the high VTVM reading. This will measure approximately -2.5 volts.
3.	"	High side to point (B). Low side to chassis. Reduce signal to point where signal on scope starts to breakup.	"	"	"	A8, A9	Adjust for cleanest maximum signal on scope. Further reduce signal level until output again breaks-up and retouch A8 and A9 for cleanest maximum signal on scope. Final adjustment should be made at that MINIMUM signal level at which undistorted audio output signal is just obtainable.

ALTERNATE SOUND IF ALIGNMENT USING AIR SIGNAL

Tune in a strong air signal. Connect the Output Meter across the speaker voice coil. Connect the DC probe of a VTVM to point (C) Common to chassis.
Adjust A7 for maximum output. If two peaks occur, use peak which gives the highest VTVM reading.
Reduce the signal by disconnecting the antenna and/or detuning the Fine Tuning until audio distortion occurs. Adjust A8 and A9 for maximum undistorted sound.
Further reduce the signal level and readjust A8 and A9 for maximum undistorted sound. Final adjustment of A8 and A9 should be made at that MINIMUM air signal level at which undistorted sound is just obtainable.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
4.	.001mfd	High side to point (B). Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	AC probe to point (D). Common to chassis.	A10	Adjust for MINIMUM deflection.

FIG. 1

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No	CBS / GENERAL ELECTRIC / RAYTHEON / SYLVANIA — USE	TYPE
V1	1st Video IF Amp.	6BZ6
V2	2nd Video IF Amp.	6BZ6
V3	Video Output-Sound IF Amp.	6AW8A
V4	AGC Keying-Noise Limiter-Sync Sep.	6BU8
V5	Audio Det.	6DT6
V8	Audio Output	9A35
V7	Sync Phase Inv. - Vert. Mult.	6CG7
V8	Vert. Mult. - Vert. Output	6DB5
V9	Horiz. Mult.	6CG7
V10	Horiz. Output	6DQ6A
V11	Damper	6AU4GTA
V12	HV Rect.	1B3GT
V13	LV Rect.	5U4GB

PICTURE TUBE

ITEM No.	REPLACEMENT DATA: TRUETONE PART No	GENERAL ELECTRIC PART No	RCA PART No	RAYTHEON PART No	SYLVANIA PART No	NOTES
V14	21DAP4	21DEP4 ①	21DAP4 ①	21DAP4	21DAP4/ 21DEP4 ② 21DEP4A ②	① Aluminized ② Silver Screen "88"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: TRUETONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	40	350	EC-115	AFH3-64-35	BO483	FP247	TMD-H	TVL-2780	
B	100	350							
C2A	80	350	EC-116	AFH3-35-30	CO235	FP330.7	TMT-H	TVL8-2629*	
B	100	350							
C3A	25	300	EC-114	AFH4-46-10	DO676	FP419.11	TMQ-H1	TVL8-3468 *	
B	60	300							
C	150	50							
C4	40	200	EC-113	PRS8580	BR4025	TC58	TD-40-350	TVA-1511	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	TOL	REPLACEMENT DATA: TRUETONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No	NOTES
C5	1.0	100		PC-89	P288N-1.0		CUB3W1	GEM-21	2TM-M1	
C6	1000		10%	CC-37	DI-1000	DD-102		JL-210	10TS-D10	
C7	20		10%	CC-134	NPO-20	D5-200	L10G28	ZT-542	10TS-Q20	
C8	3-13			TC-35						
C9	15		10%		NPO-15	D5-150	L10G15	CNO-415	10TS-Q15	①
C10	3-13			TC-35						①
C11	330			CC-96	BPD-0008	DD-331	BYA10T82	B-383	5GA-T82	
C12	1.0	100		PC-89	P288N-1.0		CUB3W1	GEM-21	2TM-M1	
C13	1000		10%	CC-37	DI-1000	DD-102	PM6DL	JL-210	10TS-D10	
C14	330			CC-96	BPD-0008	DD-331	BYA10T82	B-383	5GA-T82	
C15	330			CC-96	BPD-0008	DD-331	BYA10T82	B-383	5GA-T82	
C16	560		5%	CC-136			UBT56		MB-356	
C17	1000		10%	CC-37	DI-1000	DD-102	PM6DL	JL-210	10TS-D10	
C18	330		10%	CC-96	BPD-0008	DD-331	BYA10T82	B-383	5GA-T82	
C19	.1	600	10%	PC-78C	V84C6P1-10%		PM6PL	GTM-601	6TM-P1	
C 20	8000			CC-3	BPD-006	DD-803	BYA10D5	B-250	8SE-D50	
C21	.22	400		PC-38C	P488N-22		CUB4P22	GEM-4022	4TM-P22	
C22	.022	600	10%	PC-46C	V84C6S22-10%		PM6S22	GTM-6122	6TM-S22	
C23	.047	1000		PC-86C	P1088N-047		CUB10847	GEM-10147	10TM-S22	
C24	10000			CC-6L	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C25	1000	2000		CC-98	SVD-30-1000	DD30-102	HVB20D1	2HV-210	30GA-D10	
C26	47			CC-13	NPO-4L 47	D6-470	L10Q47	UC-5447	5GA-Q47	
C27	6.7		10%	CC-15	NPO-4L 6.7	D6-6R7	C10V47C	ZT-5547	5GA-V50	
C28	1000		10%	CC-37	DI-1000	DD-102	PM6DL	JL-210	10TS-D10	
C29	10000			CC-6L	BPD-01	DD-103	BYA10S1	JL-220	5HK-S10	
C30	100		N750 10%	CC-73	N750-DI 100	DYM-100	CUY7D1	CNT-210	10TCU-T1	
C31	.047	1000		PC-86C	P1088N-047		CUB10847	GEM-10147	10TM-S47	
C32	.047	200		PC-26C	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C33	4700			CC-99	BPD-0047	DD-472	BYA10D47MD-247		5HK-D47	
C34	1500			CC-127	BPD-0015	DD-152	BYA10D15	B-215	5HK-D15	
C35	47			CC-13	SI-47	D6-470	L10Q47	UC-5447	5GA-Q47	
C36	4700			CC-99	BPD-0047	DD-472	BYA10D47MD-247		5HK-D47	
C37	10000			CC-8L	BPD-01	DD-103	BYA10S1	B-110	5HK-S10	
C38	10000	1400		CC-121	DAC-27	DD6-103	HVE16S1	2HV-110	B1-S10	
C39	10000			CC-8L	BPD-01	DD-103	BYA10S1	B-110	5HK-S10	
C40	150			CC-122	BPD-00015	DD-151	L10T15	B-315	5GA-T15	
C41	4700			CC-99	BPD-0047	DD-472	BYA10D47MD-247		5HK-D47	
C42	82		10%	CC-130	DI-82	DD-820	L10Q82	CNO-482	10TS-Q82	
C43	2200			CC-123	BPD-0022	DD-222	BYA10D22	B-222	5HK-D22	
C44	1000	2000		CC-98	SVD-30-1000	DD30-102	HVB20D1	2HV-210	30GA-D10	
C45	.047	600		PC-46C	P488N-047	DF-503	CUB6847	GEM-6147	6TM-S47	
C46	.1	600	10%	PC-78C	V84C6P1-10%		PM6PL	GEM-601	6TM-P1	
C47	.047	1000		PC-86C	P1088N-047		CUB10847	GEM-10147	10TM-S47	③
C48	.047	600		PC-40C	P688N-047	DF-503	CUB6847	GEM-6147	6TM-S47	
C49	.1	600	10%	PC-78C	V84C6P1-10%		PM6PL	GTM-601	6TM-P1	
C50	1000	1000	10%	CC-37	DI-1000	DD-102	IR5DI	JL-210	10TS-D10	
C51	1000		10%	CC-37	DI-1000	DD-102	IR5DI	JL-210	10TS-D10	
C52	01	600		PC-18C	P688N-01	D6-103	CUB6S1	GEM-611	6TM-S1	
C53	4700			CC-99	BPD-0047	DD-472	BYA10D47MD-247		5HK-D47	
C54	.047	600		PC-40C	P688N-047	DF-503	CUB6847	GEM-6147	6TM-S47	
C55	3900		10%	MC-14	1467-0039K		IRSD39	MCB463	MB-339	
C56	330		10%	MC-25	1467-0033K		IRST33	MCB451	MB-352	
C57	680		10%	MC-31	1467-00068K	D6-681	IRST68		MB-368	
C58	4700			CC-99	BPD-0047	DD-472	BYA10D47MD-247		5HK-D47	
C59	.047	600		PC-40C	P688N-047	DF-503	CUB6847	GEM-6147	6TM-S47	
C60	.047	1000	10%					GEM-10147	10TM-S47	③
C61	.047	1000		PC-86C	P1088N-047		CUB10847	GEM-10147	10TM-S47	
C62	330		N1500 10%	CC-119						
C63	330	2000	N1500 10%	CC-119						
C64	120	2000	N1500 10%	CC-118						
C65	620			CC-96	BPD-0008	DD-331	BYA10T82	B-382	5GA-T82	
C66	.047	600		PC-40C	P688N-047	DF-503	CUB6847	GEM-6147	6TM-S47	

1. Not used in some versions
2. Some versions may use 1000mmf ③ 2000V in this application (Part #CC-98).
3. Some versions may use .027mfd 10% ⑤ 1600V in this application (Part #PC-88C).

CONTROLS

ITEM No.	RATING: RESIST ANCE	WATTS	REPLACEMENT DATA: TRUETONE PART No	CENTRALAB PART No	CIAROSTAT PART No	IRC PART No	MALLORY PART No	INSTALLATION NOTES
R1A	1meg	½	VC-173				PP16A	Volume, Tap ② 50K
B	Switch						Not Req.	Push-Pull Off-On
R2A	1000Ω	½	VC-178	B-505	A47-1000-S	QI7-108	U3	Contrast
B	Shaft			Not Req.	FS-3	Not Req	Not Req	
R3A	100K	½	VC-174	F1-31			▲ (GI-1112	Brightness
B	200K			R2-323			▲ (UE4047	Vert. Hold
R4A	1500Ω	½	VC-176	AB-4	B47-500-S	BII-103	PTA52L	Vert. Linearity
B	Shaft			AK-19	Not Req	TM4	Not Req.	
R5A	1.5meg	½	VC-175	AB-742	2847-1 Smeg-S	BII-138	TA15L	Height
B	Shaft			AK-19	Not Req	TM4	Not Req.	
R6A	100K	½	VC-177	BX-40	B47-100K-S	BII-128	PTA15L	AGC
B	Shaft			Not Req.	Not Req.	TM4	Not Req.	

▪ "Concentrikit" Equivalent: K-3 Kit with Base Elements & Shafts: BII-128, PI-304 (Panel) BII-129, RI-220 (Rear)

▲ "STA-LOC" Equivalent: FA15L, RU25L, OF32S, 182625.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R7	330Ω	
R8	10meg	
R9	5100Ω	(4700Ω) *
R10	1000Ω	
R11	2.2meg	
R12	470Ω	
R13	150K	
R14	33Ω	
R15	5600Ω 1W	
R16	220Ω	
R17	68000	
R18	100Ω	
R19	47K	
R20	7500Ω 4W	
R21	47K 1W	(82K) *
R22	180Ω	
R23	100K	
R24	56K	
R25	100K	
R26	82000 1W	
R27	39K	
R28	82K	(47K 1W) *
R29	390K	
R30	3meg 5%	
R31	39K	
R32	220K	(56K) *
R33	47K	
R34	4.7meg	

ITEM No.	RATING	REMARKS
R35	56K	
R36	18K	
R37	560K	
R38	100K	
R39	560K	
R40	82000	
R41	680Ω	
R42	47K	
R43	1meg	
R44	1meg 5%	
R45	150Ω	
R46	2200 2W	
R47	15K 2W	
R48	3 2meg	
R49	2200Ω	(6800Ω)*
R50	5600Ω	
R51	2200Ω	
R52	3300Ω	
R53	4.7meg	
R54	220K	
R55	820K	
R56	56K	
R57	100Ω	
R58	220K	
R59	2.2meg	
R60	27K 1W	
R61	390Ω 1W	
R62	470Ω 3W	

ITEM No.	RATING	REMARKS
R63	39K 1W	
R64	220Ω	
R65	220Ω	
R66	3 8Ω Cold	81R-284
R67	100K	
R68	100K	
R69	4.7meg	
R70	470K	
R71	22K 3W	
R72	9100Ω	(10K) *
R73	56K	(68K) *
R74	82K	
R75	15K	(22K) *
R76	470K	(1meg) *
R77	100Ω	
R78	12K 3W	
R79	4700Ω	
R80	150K	
R81	220K	
R82	470K	
R83	1 2Ω 1W	
R84	270K	
R85	15K	
R86	82K	
R87	120K	
R88	270K	
R89	1200Ω	
R90	39K	

* Alternate values.

COMPONENT COMBINATIONS

ITEM No	USE	DESCRIPTION	TRUETONE PART No	REPLACEMENT DATA
K1	Vert. Integrator	4700mmf, 10000mmf, 15K, 15K	CC-120	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA: TRUETONE PART No.	Gramor PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	41.25MC Trap Coil	L-161-1						
L2	47.25MC Trap Coil							①
L3	1st Video IF	L-150				6231 ▲		
L4	2nd Video IF	L-151	17-5004	17-5004	TV-126	6234		
L5	3rd Video IF	L-152						
L6	RF Choke	L-180	19-1005	19-1005	BC-566	4612		10.4uh
L7	RF Choke	L-158						27.5uh
L8A	Sound Take-Off	L-154						
B	4.5MC Trap							
L9	Series Peaking Coil	L-182						②
L10	Shunt Peaking Coil	L-183						②
L11	2nd Sound IF	L-155						
L12	Quadrature Coil	L-110A	17-1031 ▲	17-1031 ▲		1481 ▲	SD-5 ▲	
L13	Fil. Choke	L-164	19-1001	19-1001	BC-562	4604		1.0uh

▲ Disregard secondary. ① Not used in some versions. ② Wound on 470Ω resistor.
▲ Parallel with 100K resistor. ③ Wound on 10K resistor.

FILTER CHOKE

ITEM No.	RATINGS: CURRENT (Measured)	DC RES.	INDUCTANCE @ CURRENT 1000 ^(1/2)	REPLACEMENT DATA: TRUETONE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L24	.250A	52Ω	1 Hy.	FC-18	26C44	C-2996	F-801	C-2328	26C44	C-27X

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	SEC.	REPLACEMENT DATA: TRUETONE PART No.	Halldorson PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No.	NOTES
L15	97Ω		L-156	HS-5 *	TV-163 *	6210 *	H-103 *	HS-5 *	Horiz. Stabilizer * Enlarge mounting hole.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	SEC. 1	SEC. 2	REPLACEMENT DATA: TRUETONE PART No	Halldorson PART No	Merit PART No	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No
T1	117V ③ 1.7A	550VCT @ .250A	5V ④ 3A	TR-52A						
	SEC. 3	SEC. 4	SEC. 5							
	6.3V ⑤ 9A									

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: TRUETONE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Rogers PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	Vert. Output	TR-50A	26S14		V319			26S14	A-113X ①
T3A	Yoke-Horiz.(15.5MH)	L-149	Y-46 ② ③		Y-110 ②		DY-27A	Y-46 ② ③	Y-50 ③
B	(10^(1/2)-Vert (14MH)		③		③	③	② ③	③	NW-23 ③
	Rear Cover & Centering Device	MP-136							
	Yoke Clamp	ST-58							
T4	Horiz. Output	TR-51	FLY-137 *		X163 *	EFR172 *	HO-304 *	FLY-137 *	D-151R *

① Connect as autoformer. ② Use original yoke damping networks. ③ Requires new rear cover, centering device, and yoke clamping device. ④ Connect same as original.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

	ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	Ram Replacement Connections	Rogers Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
	5	5		5	5	5	5	5 & 4
	6	6		6	4	6	6	6
	7	7		7	2	7	7	7
	8	8		8	1	8	8	8
	2	1		1	7	2	1	2
	1	2		2	8	1	2	1
Special Horiz. Trans.		⑤		⑤	⑤		⑤	⑤

⑤ If AGC does not function properly, reverse connections to terminals #1 and #2.
⑥ Filament requires one turn only.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC.	REPLACEMENT DATA: TRUETONE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T5	4700Ω	3-4Ω	AT-50	24S48	A-3026	AU-601	A-3877	24S48	S-8X	

SPEAKER

ITEM No.	TYPE: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: TRUETONE PART No.	QUAM PART No	NOTES
SP1	5"	PM	3-4Ω	SPK-36	5A07	

RECTIFIERS

ITEM No.	RATING: CURRENT (Measured)	REPLACEMENT DATA: TRUETONE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1		SR-15 ①	K1615 ①	SD-9I ② ③			① Selenium Type. ② Silicon Type. ③ 2 Required.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA: TRUETONE PART No. FUSE	TRUETONE PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M2	N	3/4A 125V S/B	F-13	F-14	333.750 (N 3/4A-125V S/B)	346010	N 3/4	HN 1/2 to 3/4

CRYSTAL DIODES

ITEM No	ORIG. TYPE	REPLACEMENT DATA: TRUETONE PART No.	CBS PART No	RAYTHEON PART No	SYLVANIA PART No	NOTES
M3	1N87	SC-23	1N67	1N80	1N80	Video Det. (Pigtail)

PARTS LIST AND DESCRIPTIONS (Continued)

MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M4	Tuner Tuner	TA-51 TA-52	VHF UHF

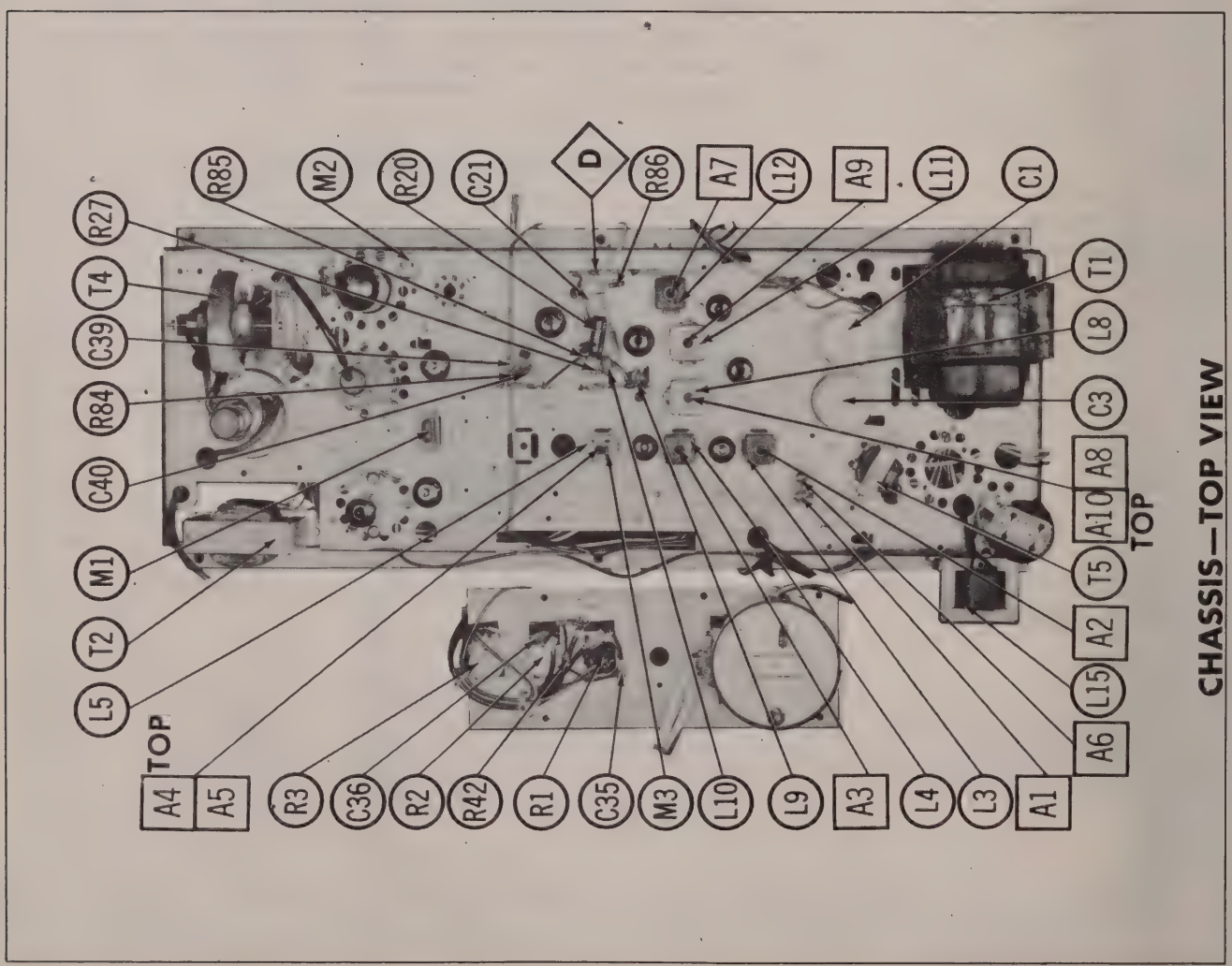
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Mask & Escutcheon	MP-135G	
Safety Glass	DW-96	
Knob	K-341	Channel Selector
Knob	K-340	Off-On-Volume, Contrast
Knob	K-338	Brightness
Knob	K-339	Vert. Hold
Cabinet	CA-263M	Mahogany
Cabinet	CA-263B	Blond
Cabinet Leg	CH-100M	Mahogany
Cabinet Leg	CH-100B	Blond

WIRING DATA

High Voltage Lead	Use BELDEN No.	8869
Shielded Hook-up Wire	Use BELDEN No.	8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No.	8874
300Ω Tuner Input Lead	Use BELDEN No.	8225
300Ω Antenna Lead-in	Use BELDEN No.	8230 or 8275
Antenna Rotor Cable	Use BELDEN No.	8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor



TUNER PARTS LIST AND DESCRIPTIONS

TA-51,U

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	6BN4A	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	6CG8A	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	120		N3300 10%	13L-031						
C202	30			13M350U300N-02						
C203A	.15		N150 7%	13L8PG150N2						
B	15		N150 7%							
C204	1000			13M350EA102Z-01	EF-001	MFT-1000			503C-D1	
C205	.27		10%	13D-111-45						
C206	2-6			31B-902-01		829-6		CT552		
C207	2-10			31B-902-09		829-10				
C208	47			13M320U470J-09	EF-00005	MFT-50				
C209	4.7		N220 ±.25mmf	13L8R4R7C						
C210	1000			13LX102Z	BPD-001	DD-102	BYA10D1	B-210	5HK-D1	
C211	13		N220 5%	13L8R130J						
C212	1.0		10%	13D-111-35	NPO-8I 1.0	TQZ-1		CNO-510	5TCCB-V1S 10% *	
C213	51		N750 10%			TCN-51	C10Q51U		5TCU-Q51S 10% *	①
C214	2-6			31B-902-01		829-6		CT552		
C215	1000			31J-024	BPD-001	DD-102	BYA10D1	B-210	5HK-D1	
C216	30			13M350U300N-02						
C217	1000			13M350EA102Z-01	EF-001	MFT-1000			503C-D1	
C218	1000			13LX102Z	BPD-001	DD-102	BYA10D1	B-210	5HK-D1	
C219	1000			13M350EA102Z-01	EF-001	MFT-1000			503C-D1	

Note 1. Some versions may use 51mmf N470 10% in this application.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
NOTE : Part numbers listed above are "Standard Coil" Part Numbers.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		PART No.
	OHMS	WATT	
R201	4700Ω		12TAE472M-01-02-03
R202	1000Ω		12TAE102M-01-02-03
R203	10K		12TAE103M-01-02-03
R204	5600Ω		12TAE562K-01-02-03

ITEM No.	RATING		PART No.	NOTES
	OHMS	WATT		
R205	220K		12TAE224M-01-02-03	
R206	100K		12TAE104M-01-02-03	
R207	1000Ω		12WAE102M-01	
R208	10K		12TAE103M-01	

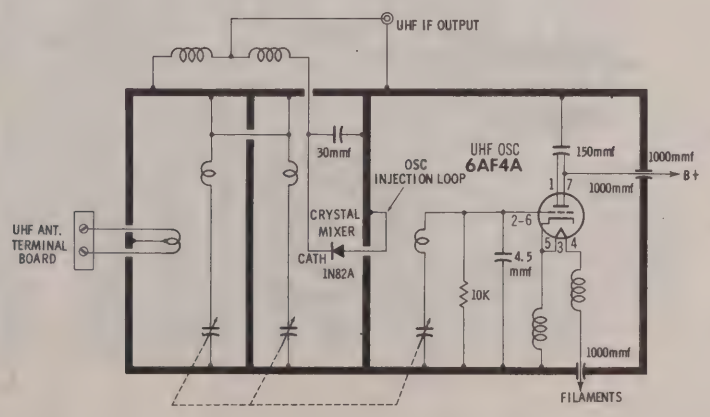
NOTE: Part numbers listed above are "Standard Coil" Part Numbers.

COILS (RF-IF)

ITEM No.	USE	PART No.	NOTES
L201	Ant. Trans.	31T3398-01	Includes L202, L203
L202	RF Choke	34A-748	
L203	IF Trap Coil	34A-762	
L204	Ant., RF, Mixer Grid & Osc. Coils	31T-3361-06	Includes Rotor Disc Assy.

ITEM No.	USE	PART No.	NOTES
L205	RF Choke	34A-1005	
L206	Fine Tuning Coil	34A-787-03	
L207	Fil. Choke	31K-137-027	
L208	Mixer Plate Coil	31UA-580-017	

NOTE: Part Numbers listed above are "Standard Coil" Part Numbers.



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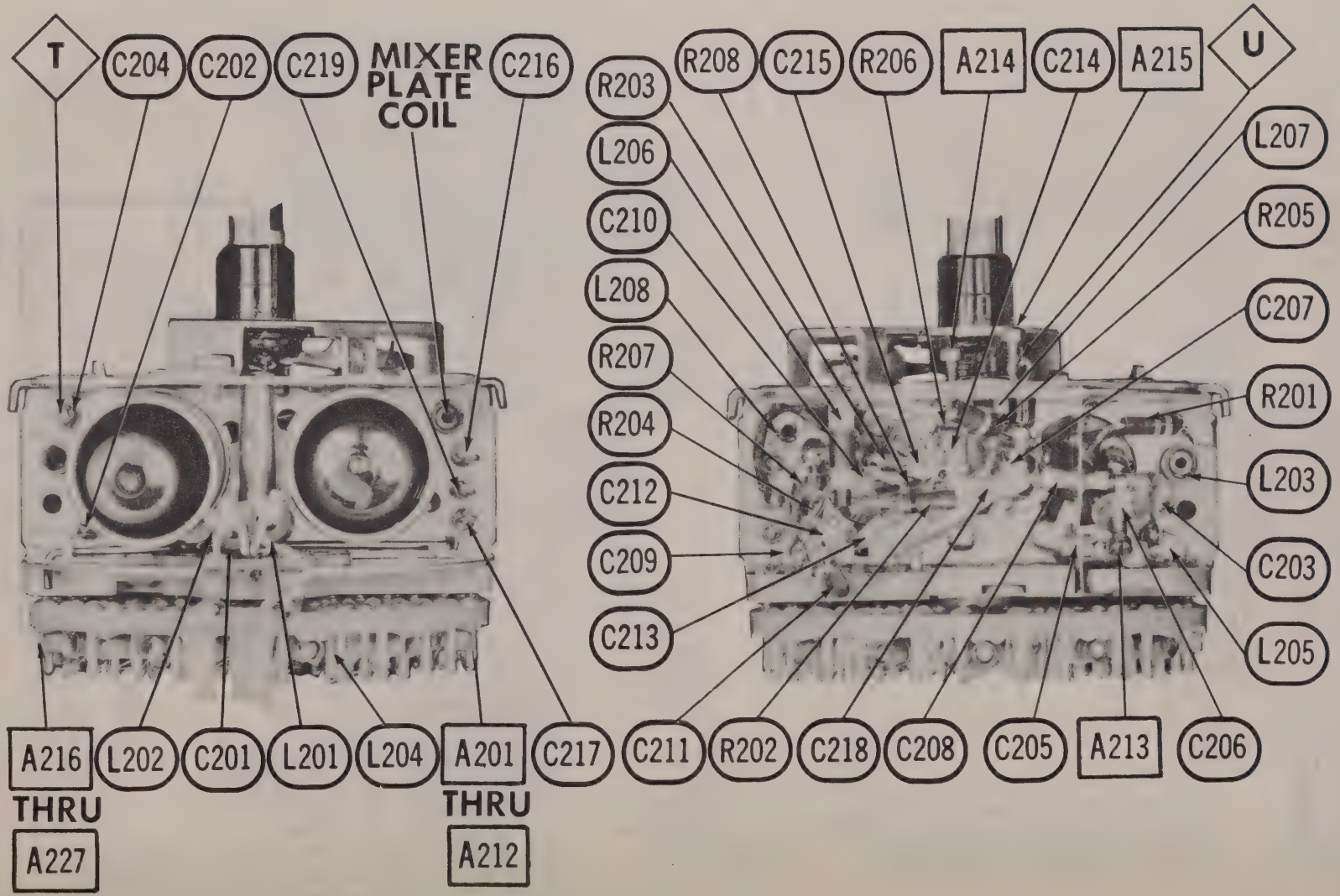
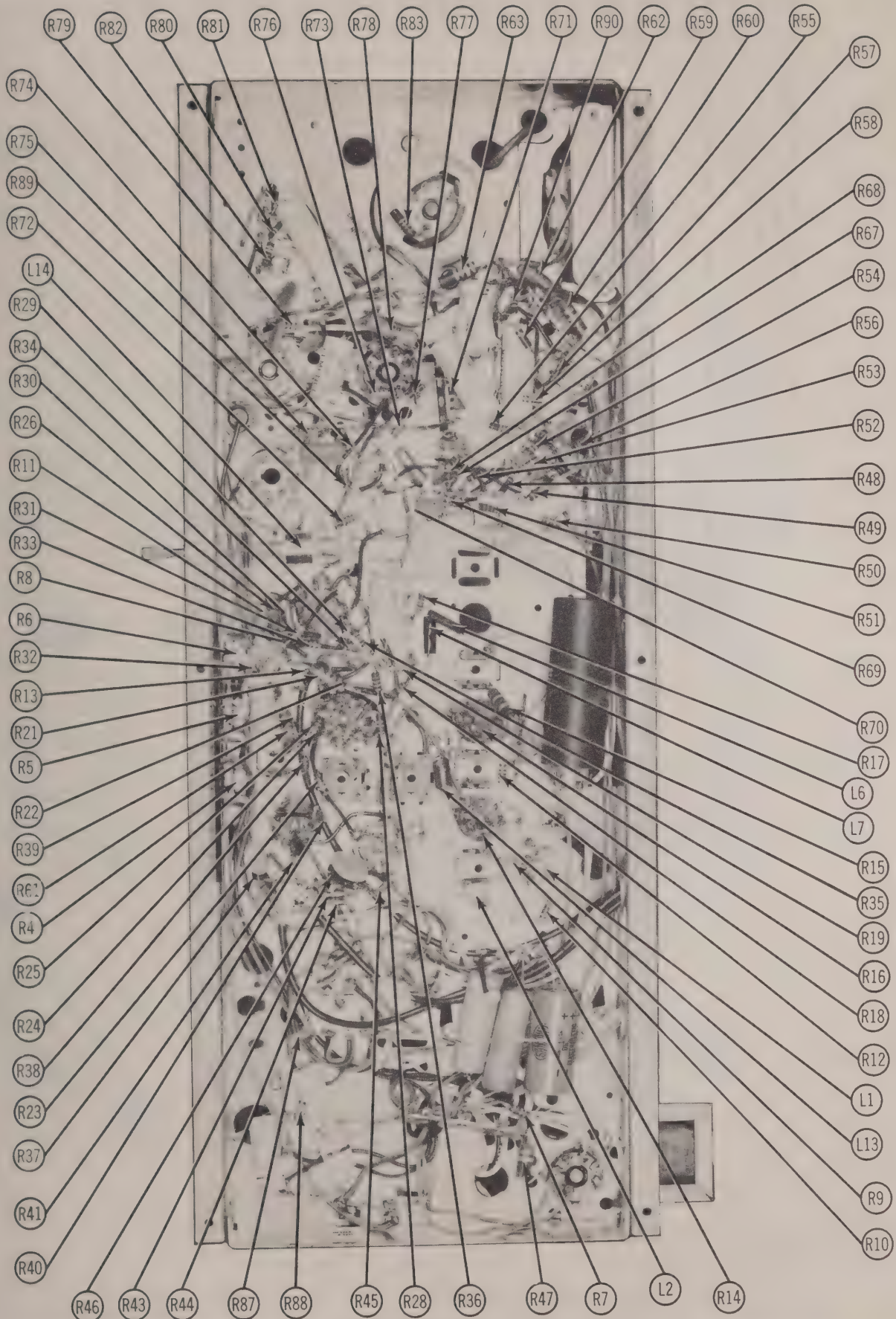
UHF TUNER TA-52


T
C204
C202
C219
MIXER PLATE COIL
C216
R203
L206
C210
L208
R207
R204
C212
C209
C213
R208
C215
R206
A214
C214
A215
U
L207
R205
C207
R201
L203
C203
L205
A216
L202
C201
L201
L204
A201
C217
C211
R202
C218
C208
C205
A213
C206
THRU
A227
THRU
A212

TUNER TA-51



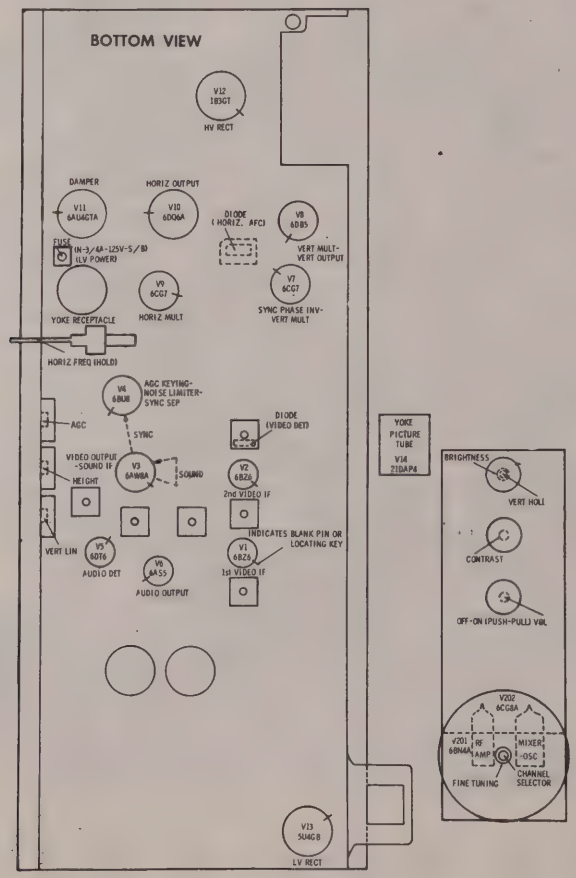
CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

RESISTANCE MEASUREMENTS

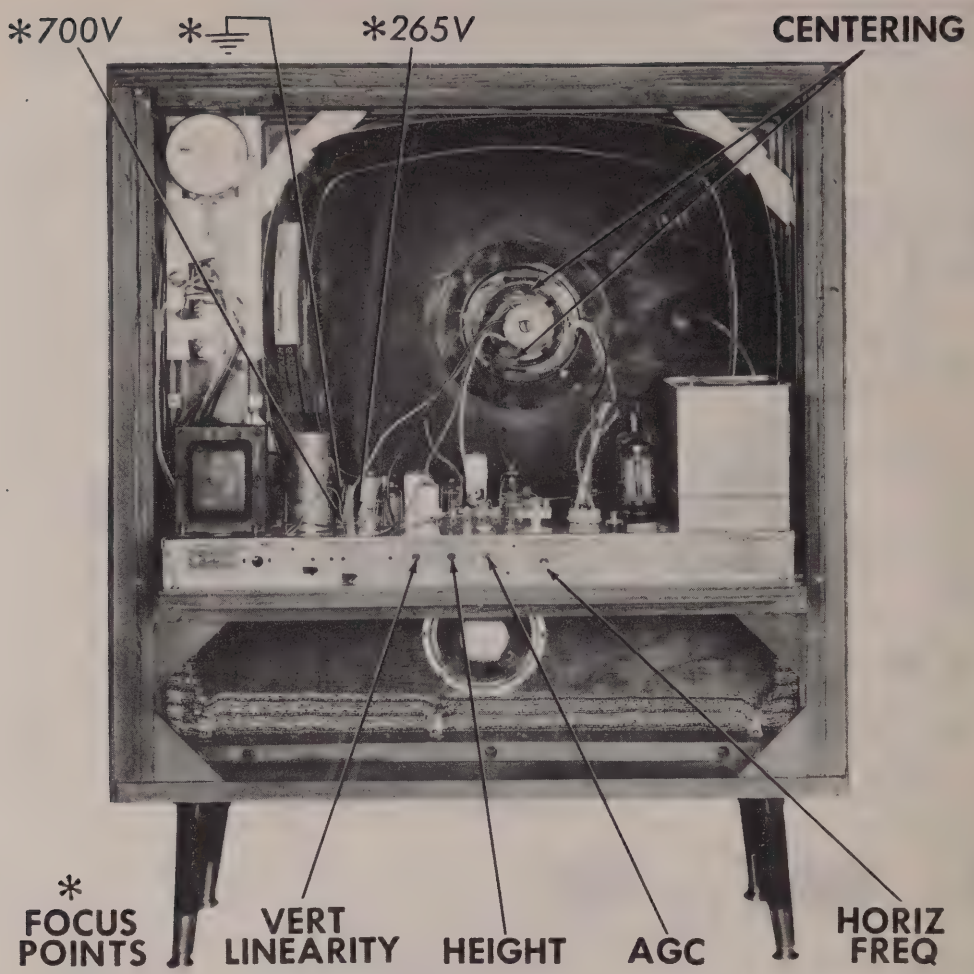
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BZ6	150K	33Ω	0Ω	.1Ω	▪ 470Ω	▪ 470Ω	0Ω		
V2	6BZ6	.1Ω	220Ω	.1Ω	0Ω	†5600Ω	†5600Ω	0Ω		
V3	6AW8A	0Ω	100K	▪ 100K	0Ω	.1Ω	● 50Ω	6900Ω	†22K	†6500Ω
V4	6BU8	▪ 0Ω	†8200Ω	2.3meg	0Ω	.1Ω	†27K	†390K	†30K	▪4.7meg
V5	6DT6	18Ω	680Ω	.1Ω	0Ω	†780K	▪ 8200Ω	560K		
V6	6AS5	¶	550K	.1Ω	0Ω	550K	†220Ω	†510Ω		
V7	6CG7	● †1.4meg	220K	● 120K	0Ω	.1Ω	†7800Ω	1.8meg	3300Ω	0Ω
V8	6DB5	†27K	● 600Ω	2.2meg	0Ω	.1Ω	2.2meg	● 600Ω	NC	†840Ω
V9	6CG7	†9000Ω	5.2meg	1200Ω	.1Ω	0Ω	†82K	56K	1200Ω	0Ω
V10	6DQ6A	NC	0Ω	NC	†12K	470K	TP	.1Ω	0Ω	TOP CAP †10Ω
V11	6AU4GTA	NC	NC	¶750K	NC	†0Ω	NC	.1Ω	0Ω	
V12	1B3GT		PINS	1 THRU 8	HAVE	INFINITE	RESISTANCE			TOP CAP †440Ω
V13	5U4GB	NC	¶	NC	22Ω	NC	23Ω	NC	¶	
V14	21DAP4	0Ω	39K	†120K	0Ω	NC	39K	● 100K	.1Ω	
V201	6BN4A	0Ω	3.7meg	0Ω	.1Ω	▪ 1300Ω	0Ω	3.7meg		
V202	6CG8A	10K	5900Ω	0Ω	0Ω	.1Ω	▪ 1300Ω	▪ 10K	0Ω	320K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
● THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
▪ MEASURED FROM 150V SOURCE.
† MEASURED FROM 265V SOURCE.
‡ MEASURED FROM PIN 3 OF V11.

NC NO CONNECTION
TP TIE POINT



TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Set the Brightness and Contrast controls for a normal picture.

Turn the Horizontal Frequency clockwise until the picture loses sync.

It may be necessary to switch off channel and back again for picture to lose sync.

Turn the Horizontal Frequency slowly counterclockwise until the picture falls into sync.

PHOTOFACT* Folder

*TRADE MARK

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

PRODUCTION CHANGE BULLETIN 227

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 1 IN SET 420

AIRLINE MODELS GTM-4201B, C, GTM-4301B, C

Airline Models GTM-4201A, GTM-4301A were covered in PHOTOFACT Folder 1 - Set 420.

Airline Models GTM-4201B, C, GTM-4301B, C are electrically identical except for the following changes.

GTM-4201B, GTM-4301B

SPOT ELIMINATOR CIRCUIT REMOVED

A different switch and volume control is used (Part #270V058H01). When this change is made the spot eliminator section of R1C (Off-On switch) is removed.

TO REDUCE SOUND DISCRIMINATOR DRIFT

V4 (3BN6) tube socket is changed to a mica filled type (Part #751V524H02).

FILAMENT STRING CHANGED

V3 (6BH8) is removed from between V4 (3BN6) and V8 (12W6) and is relocated between V13 (17CFP4) and V7 (6CN7).

GTM-4201C, GTM-4301C

VIDEO IF RESPONSE IMPROVED

R8 is increased from 5600Ω to 47K.

C52 is omitted.

TO IMPROVE VERTICAL RETRACE BLANKING

C20 is relocated between pin 10 of the picture tube and the junction of C38 and R50.

TO ELIMINATE SNIVETS

A 150Ω resistor is added between pin 7 of V6 (3CS6) and the junction of C30 and R35.

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 1 IN SET 421

AIRLINE MODELS GTM-4202B, C, GTM-4302B, C

Airline Models GTM-4202A, GTM-4302A were covered in PHOTOFACT Folder 1 - Set 421.

Airline Models GTM-4202B, C, GTM-4302B, C are electrically identical, except for the following changes.

GTM-4202B, GTM-4302B

SPOT ELIMINATOR CIRCUIT REMOVED

A different switch and volume control (Part #270V058H01) is used. When this change is made the spot eliminator section of R1C (On-Off switch) is removed.

TO ELIMINATE BEAT INTERFERENCE

A 680mmf capacitor ⓐ 2KV is added from the shield of L15 to the chassis rails.

An 8200Ω ½W resistor is added in parallel with L6.

TO REDUCE SOUND DISCRIMINATOR DRIFT

V5 (3BN6) tube socket is changed to a mica filled type (Part #751V524H02).

(Continued on Reverse Side)

PRODUCTION CHANGE BULLETIN 227

PRODUCTION CHANGE BULLETIN 227

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	FILAMENT CIRCUIT CHANGED V4 (6BH8) was removed from between V5 (3BN6) and V9 (12EN7GT) and relocated between V14 (17CFP4) and V8 (6CN7).
GTM-4202C, GTM-4302C	TO ELIMINATE BEAT INTERFERENCE ON CHANNEL 8 A 1.1uh Peaking coil (Part #230V019H03) is added between L6 and CircuiTrace point 7. TO IMPROVE VERTICAL RETRACE BLANKING C23 is relocated between pin 10 of the picture tube and the junction of C41 and R54. TO ELIMINATE SNIVETS A 150Ω $\frac{1}{2}$W resistor is added between pin 7 of V7 (3CS6) and the junction of C33 and R42.

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 13 IN SET 400

WOLLENSAK MODEL T-1515

Wollensak Model T-1500 was covered in PHOTOFACT Folder 13 - Set 400.

Model T-1515 is electrically identical to the model covered except for the following changes.

COMPONENT CHANGES

C12 is decreased from 50000mmf to 25000mmf.

C19 is decreased from 680mmf to 100mmf.

L2 (Equalizer coil) is omitted.

C13 in series with L2 to ground, is moved to the junction of C12, R16 and pin 3 of V2A to ground.

K1 (Tone Comp.) is changed to Part #A177-10. A partial schematic showing the new K1 is given below in this bulletin

K2 (AF Amp.) is changed to Part #A177-11. A partial schematic showing the new K2 is given below in this bulletin

K3 (Tone Comp.) is changed to Part #A177-9. A partial schematic showing the new K3 is given below in this bulletin

C4C is decreased from 50mfd @ 10V to 30mfd @ 10V.

R20 is increased from 180K to 330K.

R38 is increased from 4700Ω to 10K.

A 220mmf capacitor is added across R38.

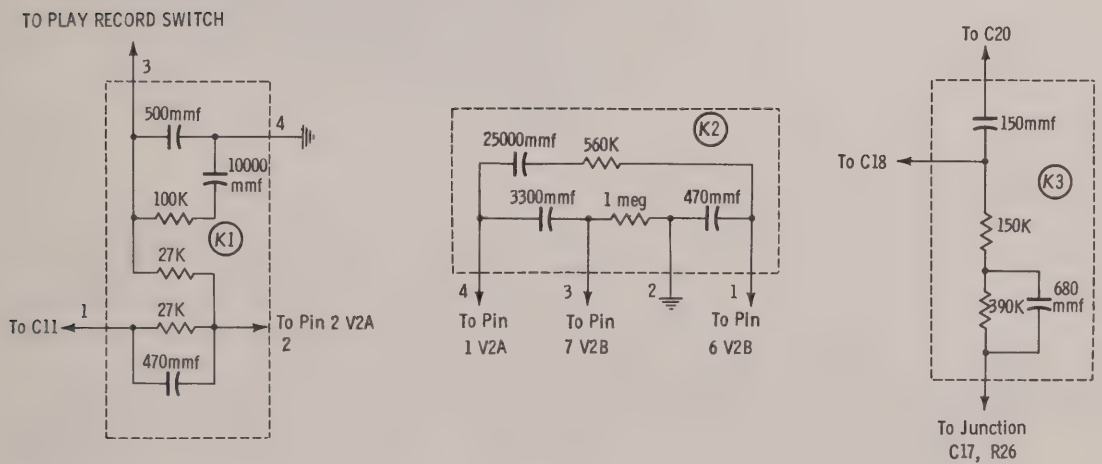
C15 is omitted.

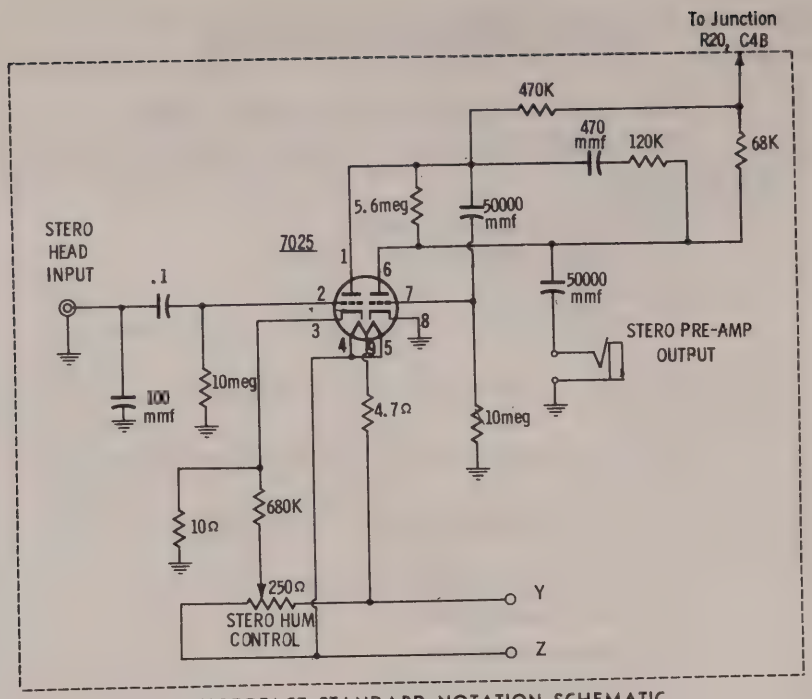
A .05mfd capacitor is added from the junction of R29, M1 and M2 to B-.

A .05mfd capacitor is added across M2.

STEREO PREAMP ADDED

A stereo preamp is added in Model T-1515. A schematic showing the new preamp. is given on the reverse side of this bulletin





A PHOTOFACT STANDARD NOTATION SCHEMATIC

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PHOTOFACT* Folder with CIRCUITRACE*

ARVIN MODELS 2091, 2092, 6091, (Ch. 11.45300, 400, 900)

ARVIN MODELS 2091, 2092, 6091, (Ch. 11.45300, 400, 900)

MODEL 2092

ARVIN MODELS 2091, 2092, 6091, (Ch. 11.45300, 400, 900)

TRADE NAME	Arvin Models 2091 (Ch. 11.45300), 2092 (Ch. 11.45400), 6091 (Ch. 11.45900)
MANUFACTURER	Arvin Industries, Inc., Columbus, Indiana
TYPE SET	AC Operated 2 Tube Phono Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles RATING 44 Watts, .44 Amp. @117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON SOME RECORD CHANGERS — SEE SIMILAR MONARCH UA8 — PHOTOFACT SET 381 FOLDER 11
FOR SERVICE INFORMATION ON RECORD CHANGER USED IN OTHER VERSIONS — SEE SIMILAR V-M 1200A — PHOTOFACT SET 353 FOLDER 16 OR RECORD CHANGER MANUAL RC-10

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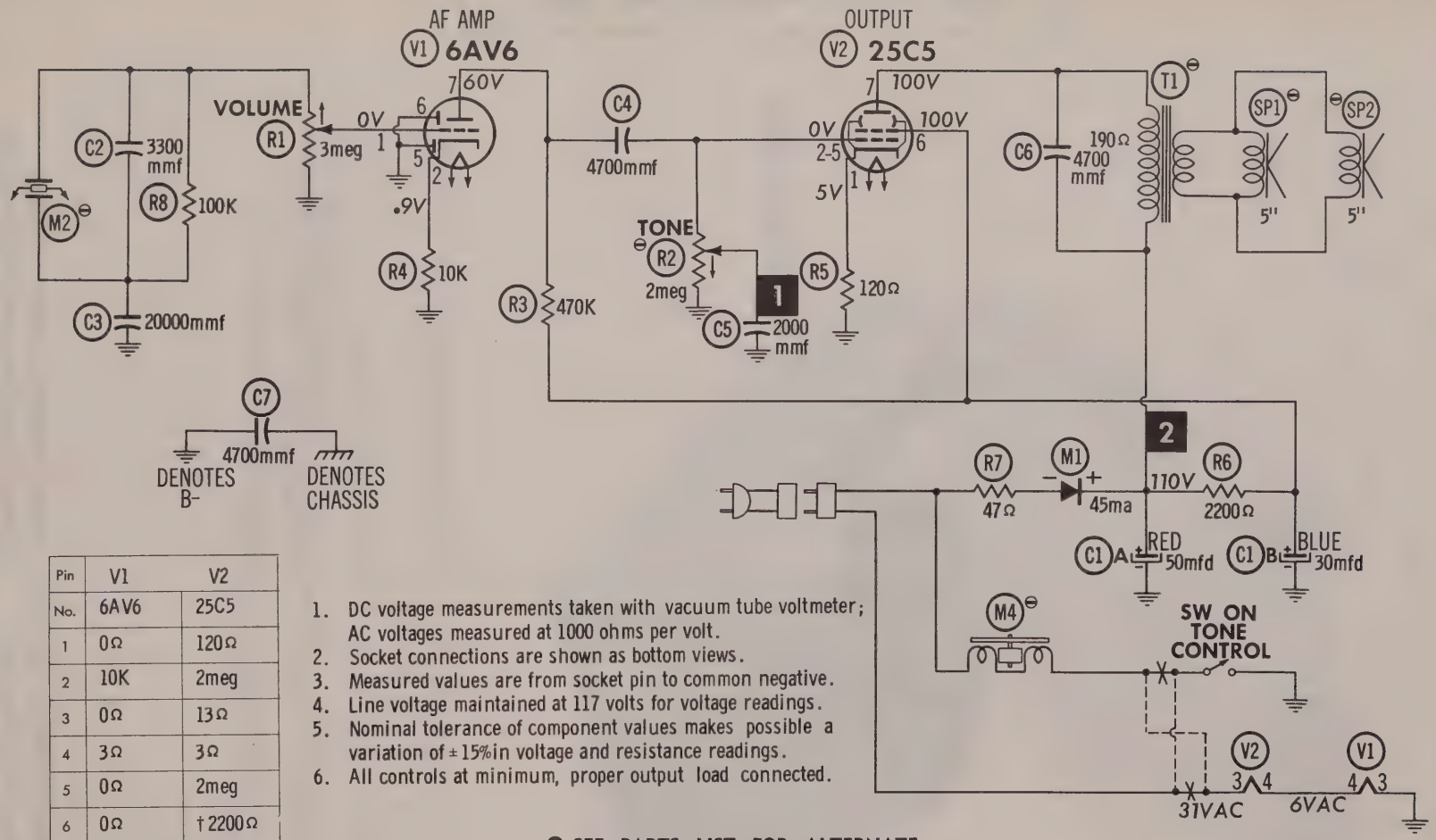

Pin No.	V1 6AV6	V2 25C5
1	0Ω	120Ω
2	10K	2meg
3	0Ω	13Ω
4	3Ω	3Ω
5	0Ω	2meg
6	0Ω	†2200Ω
7	†470K	†190Ω

† MEASURED FROM OUTPUT OF M1

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL—RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE*

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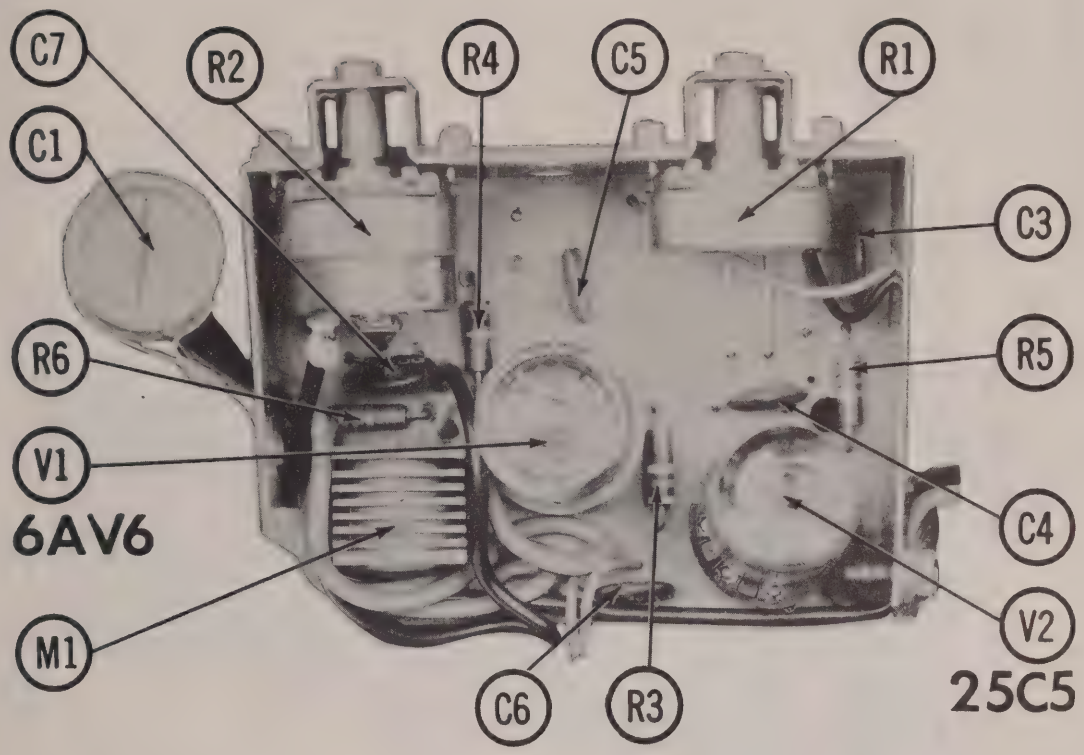
ARVIN MODELS 2091, 2092, 6091, (Ch. 11.45300, 400, 900)



CHASSIS-TOP VIEW

A Howard W. Sams CIRCUITRACE® Photo

PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆

ITEM No.	USE	TYPE
V1	AF Amp.	6AV6
V2	Output	25C5

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	ARVIN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	50	150	45952-1	PRS150V50-30	BBRD5315	TCD497	TDLD-8	TVA-2450	
B	30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	ARVIN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	3300				BPD-0033	DD-332	BYA10D33	B-233	5HK-D33	
C3	20000				BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C4	4700				BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	
C5	2000				BPD-002	DD-202	BYA10D2	B-220	5HK-D2	
C6	4700				BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	
C7	4700				BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ARVIN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	3meg		45250-6					Volume
R2A	2meg		45250-7				TA-26A	Tone Note 1
B	Switch						US-26	Off-On

Note 1. Model 6091 uses 2 meg tone without switch (Part #45250-10.)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R3	470K	
R4	10K	

ITEM No.	RATING	REMARKS
R5	120Ω	
R6	2200Ω	

ITEM No.	RATING	REMARKS
R7	47Ω	
R8	100K	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	ARVIN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2700Ω	3-4Ω	42700-20①	24S53	A-3025	AU-605	A-3332	24S53	S-12X	① Alternate Part # 42700-21

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	ARVIN PART No.	QUAM PART No.	
SP1	5"	PM	6-7Ω	45599-4	5A1Z6.4	
SP2	5"	PM	6-7Ω	43365-2	5A1Z6.4	
	5"	PM		45599-3 ①		① Used in Model 2091

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	ARVIN PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.045A	44465-4 ①	1234AH①	T065 ①	65A ①		① Selenium Type

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA							REMARKS
	ARVIN PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M2	45955	314-TS	N8-1 & N8-3			#1	Not Req.	
	46377 ①	414-2	N8-2			#31	Not Req.	① Used in Model 6091

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	ARVIN PART No.	JENSEN PART No.	WALCO PART No.	
M3	78 RPM	CRA-55 † ① or CRA-55D ◆②		† Jewel ◆ Diamond ① Used with Jensen Cartridge #1 ② Used with Jensen Cartridge #31
	LP	CRA-55LP † ① or CRA-55LPD ◆ ② CRA-552† ② CRA552D◆②		

MISCELLANEOUS

ITEM No.	PART NAME	ARVIN PART No.	NOTES
M4	Motor	47185	Models 2091, 2092

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	45954-673	Volume, Model 2092, 6091
Knob	45954-671	Volume, Model 2091
Knob	45954-674	Tone, Model 2092
Knob	45954-672	Tone, Model 2091
Knob	45954-675	Tone, Model 6091
Cabinet	47184-87	Model 2092
Cabinet	47184-55	Model 2091, Blue
Cabinet	47184-103	Model 2091, Red
Cabinet	47187-87	Model 6091

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

Low-Loss Shielded Lead (Interconnecting) ..... Use BELDEN No. 8401

Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

CROWN MODEL TR-820

CROWN MODEL
TR-820

CROWN MODEL
TR-820

TRADE NAME	Crown Model TR-820
IMPORTER	Shriro, Inc., 276 Fourth Ave., New York 10, N. Y.
TYPE SET	Battery Operated Portable Transistorized AM Receiver
POWER SUPPLY	9 Volts DC
TUNING RANGE—BROADCAST	525KC — 1650KC
RATING	7.6MA @ 9 Volts DC (No Signal, Min. Volume) 8MA @ 9 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools: A3, A4, A5..... GENERAL CEMENT #9087, 9089
WALSCO #2528

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400∿ Mod.)	Tuning gang fully open.	Across voice coil	A1, A2	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	525KC	Tuning gang fully closed.	"	A3	"
3.		"	1650KC	Tuning gang fully open.	"	A4, A5	"
4.		"	650KC	650KC	"	A6	"

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JF259

SET 460 FOLDER 5

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N411①	Converter		2N411	2N486	2N411	PNP
X2	2N409②	IF Amplifier		2N409	2N483	2N409	PNP
X3	2N407 ③	Driver		2N407	2N362	2N407	PNP
X4	2N407 ④	Output		2N407	2N631	2N407	PNP

① Some versions may use GT-761R in this application.
② Some versions may use GT-760R in this application.
③ Some versions may use GT-81 in this application.
④ Some versions may use GT-81HSR in this application.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	CROWN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	50	10		XPP-10050	NLW50-10	TT10X50	ML50-15	TE-1119	
C2	6	6		XPP-6006	NLW6-15	TT6X5	ML6-6	TE-1085	
C3	30	6		XPP-6030	NLW30-6	TT6X30	ML30-6	TE-1092	
C4	50	6		XPP-6050	NLW50-6	TT6X50	ML50-6	TE-1100	
C5	50	6		XPP-6050	NLW50-6	TT6X50	ML50-6	TE-1100	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	CROWN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C6	.01	50			P285N-01	DD-103	STM1S1	GTM-111	65P10352	
C7	200				SI 200	D6-201	L10T2	UC-532	5GA-T2	
C8	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C9	5				SI 5	D6-050	L10V5	ZT-555	5GA-V5	
C10	.02	50			P285N-02	DD-203	STM1S22	GTM-112	65P20352	
C11	5		±.5mmf		NPO-SI 5		L10V5		5GA-V5S ±.5mmf*	
C12	200				SI 200	D6-201	L10T2	UC-532	5GA-T2	
C13	.02	50			P285N-02	DD-203	STM1S22	GTM-112	65P20352	
C14	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C15	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	①

① Not used in some versions.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	CROWN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	10K	½						Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

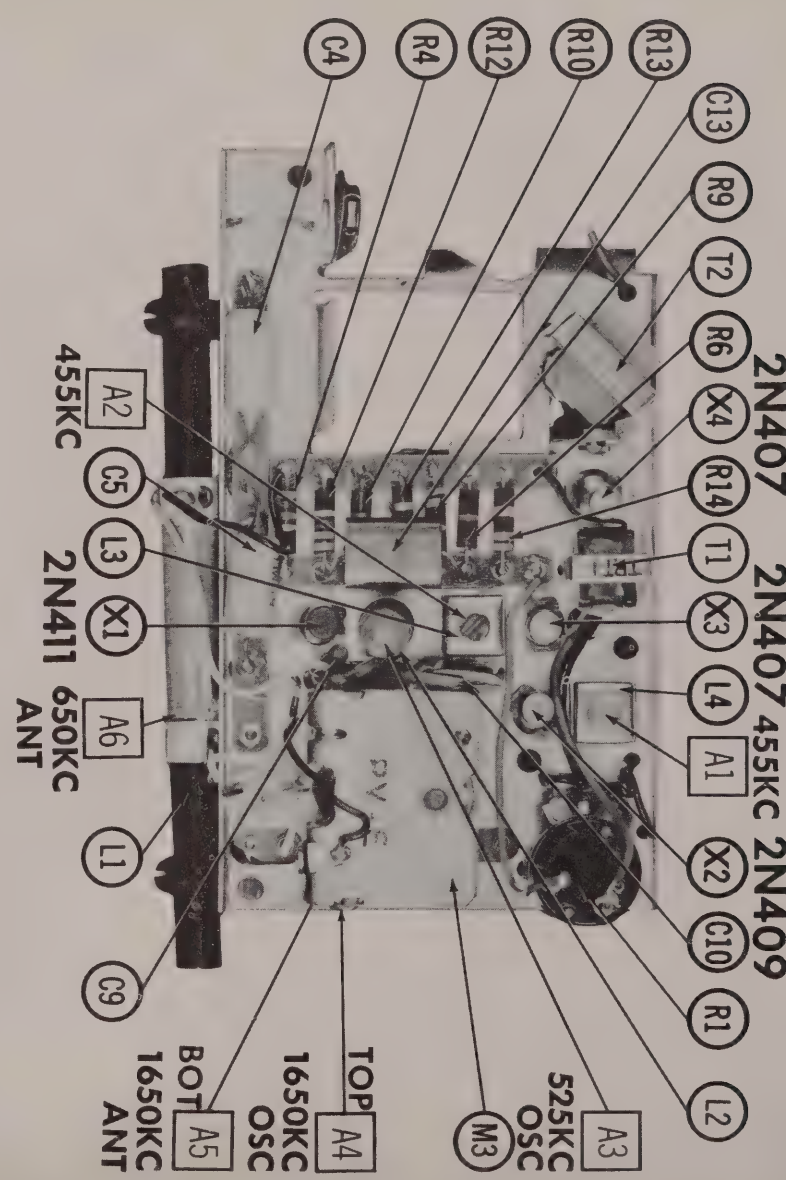
ITEM No.	RATING	REMARKS
R2	18K	
R3	47K	
R4	5100Ω	
R5	1000Ω	
R6	1000Ω	

ITEM No.	RATING	REMARKS
R7	10K	
R8	150K	
R9	4700Ω	Note 1
R10	33K	
R11	1000Ω	

ITEM No.	RATING	REMARKS
R12	560Ω	
R13	8200Ω	Note 1
R14	56Ω	
R15	150Ω	

Note 1. Value may vary, replace with original value.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		CROWN PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick							
L2	Osc. Coil							
L3	Input IF		16-9016	16-9016		9-C1		
L4	Output IF		16-9017	16-9017		9-C2		

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	CROWN PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	5	1	TRT-1						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	CROWN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	360Ω	10Ω	TRT-2	TR-19			TA-20	TR-19		

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	CROWN PART No.	QUAM PART No.	
SP1	2½"	PM	10Ω			

BATTERIES

ITEM No.	VOLTAGE	CROWN PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V			2U6		216		M1604	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		CROWN PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	SD-46		1N60	1N60	1N295	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	CROWN PART No.	NOTES
M3	Tuning Cap		2 Gang (Ant. 11 — 172mmf, Osc. 15 — 77mmf)

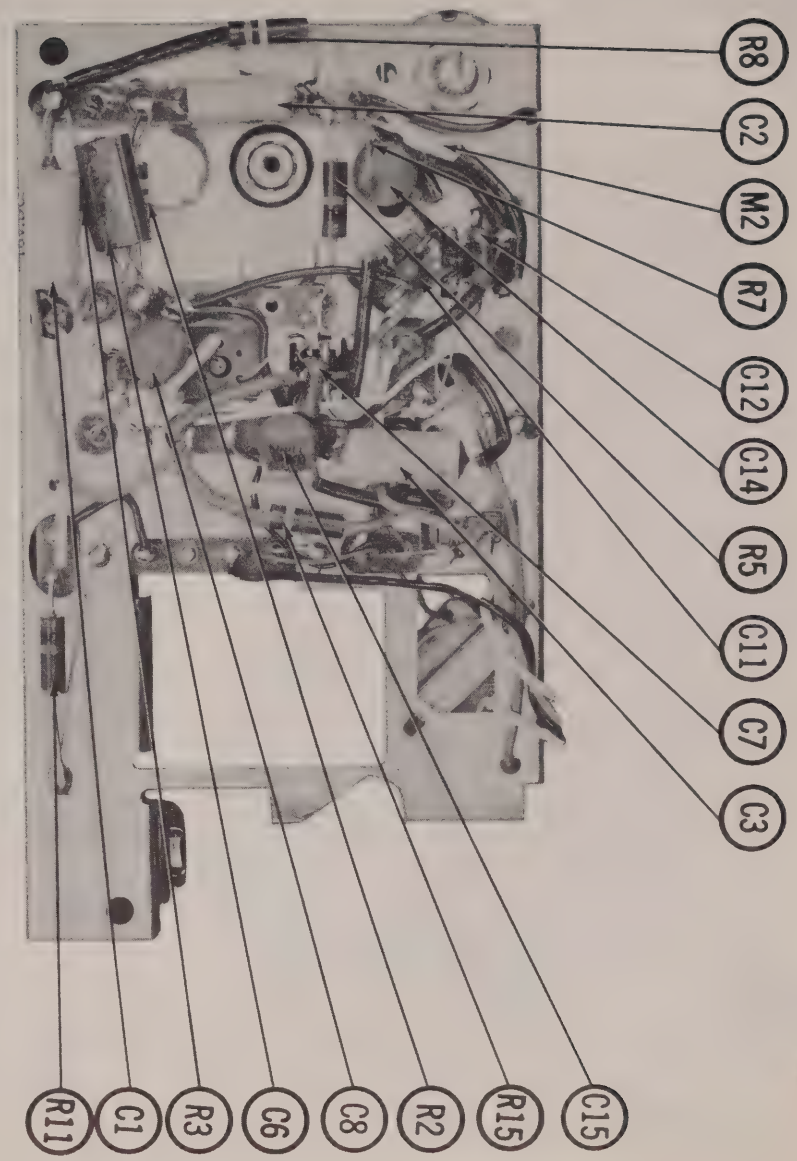
CABINETS & CABINET PARTS

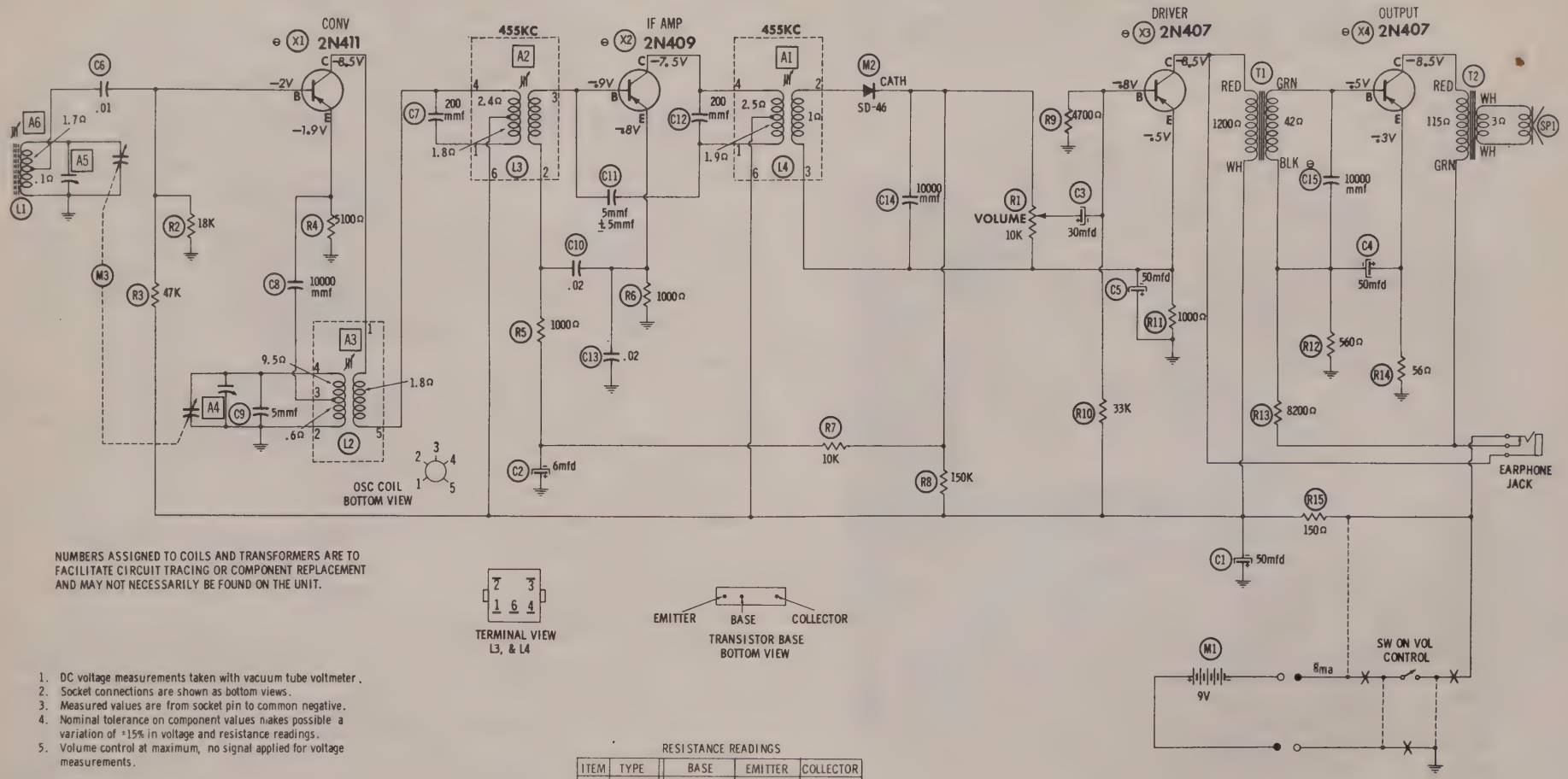
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS BOTTOM VIEW





NUMBERS ASSIGNED TO COILS AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

TERMINAL VIEW L3, & L4

TRANSISTOR BASE BOTTOM VIEW

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

RESISTANCE READINGS

ITEM	TYPE	BASE	EMITTER	COLLECTOR
X1	2N411	15K	5100Ω	†155Ω
X2	2N409	14K	1000Ω	†150Ω
X3	2N407	4300Ω	1000Ω	†1200Ω
X4	2N407	600Ω	56Ω	†115Ω

TRANSISTORS REMOVED FOR RESISTANCE MEASUREMENTS.
† MEASURED FROM JUNCTION OF R15 AND M1.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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CROWN MODEL TR-820

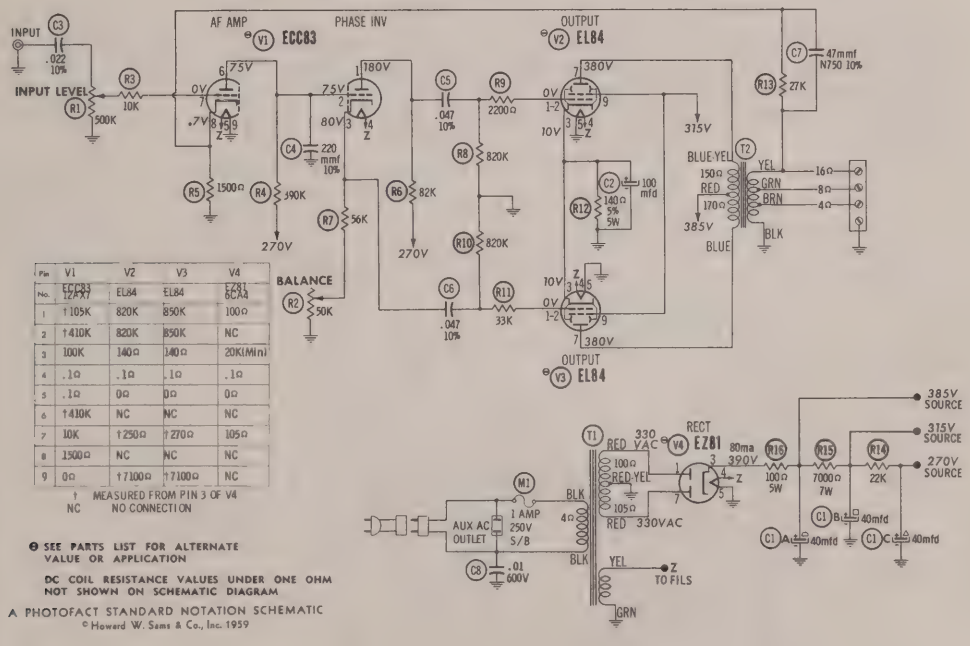
PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

FISHER MODEL 30-A

FISHER MODEL 30-A

TRADE NAME	Fisher Model 30-A (Serial #30001-39999 inclusive)
MANUFACTURER	Fisher Radio Corp., 21-21 44th Drive, Long Island City 1, N. Y.
TYPE SET	AC Operated 4 Tube Audio Amplifier
POWER SUPPLY	105 - 125 Volts AC, 60 Cycles RATING 62 Watts, .63 Amp. @ 117 Volts AC



Pin No.	V1 ECC83 12AX7	V2 EL84	V3 EL84	V4 EZ81 6CA4
1	†105K	820K	850K	100Ω
2	†410K	820K	850K	NC
3	100K	140Ω	140Ω	20K(Min)
4	.1Ω	.1Ω	.1Ω	.1Ω
5	.1Ω	0Ω	0Ω	0Ω
6	†410K	NC	NC	NC
7	10K	†250Ω	†270Ω	105Ω
8	1500Ω	NC	NC	NC
9	0Ω	†7100Ω	†7100Ω	NC

† MEASURED FROM PIN 3 OF V4
NC NO CONNECTION

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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FISHER MODEL 30-A

SET 460 FOLDER 6

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	AF Amp. -Phase Inv.	ECC83/12AX7(7025)*	V3	Output	EL84/6BQ5 (7189)*
V2	Output	EL84/6BQ5 (7189)*	V4	Rectifier	EZ81/6CA4

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA FISHER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▬40	450	C677-120	AFH3-44	C0350	FP377	TMT-40	TVL-3787	
B	■40	350							
C	▲40	350							
C2	100	25	C677-145	SRE25V100	BBR100-25	TC2501	ML100-25	TE-1211	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA FISHER PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	.022	250	10%	C50074-26	V84C4S22		PM4S22	GTM-4122	4TM-S22	
C4	220		10%	CC21GP221K5	NPO-SI 220	D6-221	L10T22	JL-322	5GA-T22S 10%*	
C5	.047	500	10%	C50074-37	V84C6S47		PM6S47	GTM-6147	6TM-S47	
C6	.047	500	10%	C50074-37	V84C6S47		PM6S47	GTM-6147	6TM-S47	
C7	47		N750 10%	CC21GP470K5	N750-SI 47	TCN-47	C10Q47U	CN7-447	5TCU-Q47S 10%*	
C8	.01	600		C2747	P688N-01	D6-103	CUB6S1	GEM-611	6TM-S1	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA FISHER PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	500K	1/4	R520-139	JP-504	48M-500K-S			Input Level
R2A	50K	½	R50103-3	BX-31	A47-50K-S	Q11-123	SU-35	Phase Inverter Balance
B	Shaft			Not Req.	FKS-1/4	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R3	10K	
R4	390K	
R5	1500Ω	
R6	82K	
R7	56K	

ITEM No.	RATING	REMARKS
R8	820K	
R9	2200Ω	
R10	820K	
R11	33K	
R12	140Ω 5%5W	

ITEM No.	RATING	REMARKS
R13	27K	
R14	22K	
R15	7000Ω 7W	
R16	100Ω 5W	

TRANSFORMER (POWER)

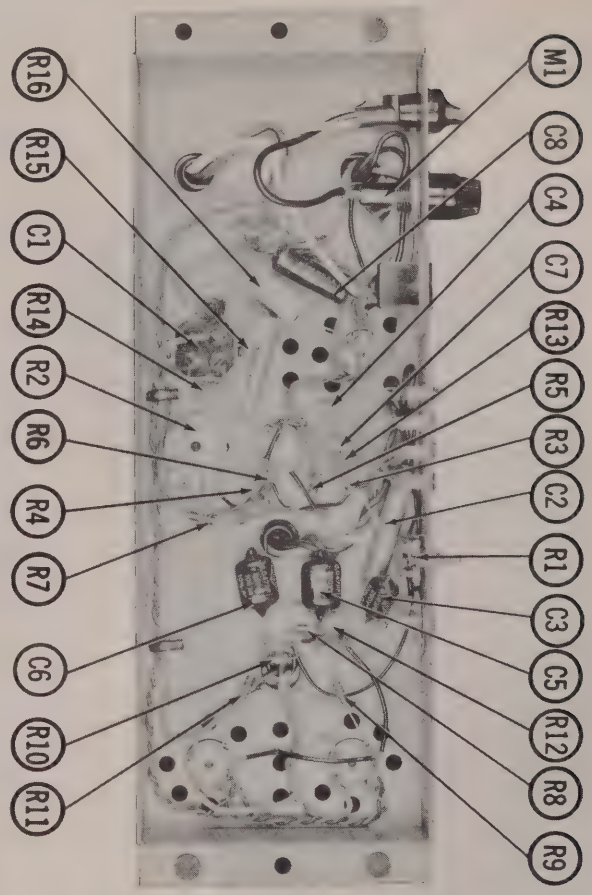
ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA FISHER PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V@ .63A	660 VCT @ .080A	6.3V@ 2.8A	T725-115	24R40U	P-3152①		PC8409	24R40U	R-11A①

① Drill New Mounting Holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA FISHER PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	7000Ω CT	16Ω Taps@ 8Ω, 4Ω	T725-116	22S68①	A-3128①		A-3307①	22S68 ①	S-24A①	① Drill New Mounting Holes

CHASSIS BOTTOM VIEW



FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA FISHER PART No. FUSE	FISHER PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	1A 250V S/B	F692-132		313001. (3AG 1A 250V) S/B	342001	MDL 1	HKP

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

PHOTOFACT* Folder

*TRADE MARK

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

GBC MODEL
Phonetic PT/12

GBC MODEL
Phonetic PT/12

GBC MODEL
Phonetic PT/12

GENERAL INFORMATION

Model GBC Phonetic PT/12 tape recorders feature push-button controls for rewind, playback, stop, record, and fast forward. These units record and play back two tracks of material on standard 1/4-inch recording tape, thus doubling the playing time of a 3-inch reel. Recordings can be played back through the self-contained speaker or through an external speaker.

There are two tape speeds, 1 7/8 and 3 3/4 ips. At 1 7/8 ips, up to one hour and twenty minutes can be recorded with a thin tape.

An automatic tape counter permits recorded material to be indexed and easily located. Jacks are provided for connecting a pickup, microphone, earphones, and additional loudspeaker, and an external amplifier.

These recorders operate on 110-125 volts, 60 cycles AC only.

Supplied By:

GBC America Corporation
243 Broadway
New York, New York

This material compiled and published by

HOWARD W. SAMS & CO., INC., INDIANAPOLIS 6, INDIANA

C401

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Preparing for Operation

With the On-Off switch in the Off position, plug the AC cord into a convenient wall receptacle of the proper rating.

Threading Tape

1. Turn the Counter knob clockwise to zero. Place a reel of tape on the left reel plate. Place an empty reel on the right reel plate. Make sure the slots in the reel engage the protrusions on the reel plates. Unwind approximately eight inches of tape from the left reel.

2. Place tape over tape guide (78), then into tape slot, and between pressure roller (34) and capstan (72).

3. Insert free end of the tape (dull side facing the operator) into one of the slots in the empty reel hub. Hold the tape in place and turn the reel two or three times until the tape is secured to the reel.

4. Turn the Speed Change knob until the red dot points to the + or - (+ for 3 3/4 ips; - for 1 7/8 ips).

NOTE: When the red dot points to 0, the motor is in neutral and the reels will not move.

To Record From Microphone

1. Turn the On-Off switch to the right until it clicks. Then allow 20 seconds for the unit to warm up. The green light on the level indicator will go on when the unit is ready.

NOTE: In cold weather, let the motor idle awhile before using the recorder. To idle the motor, turn the Speed Change knob until the red dot points to 0, and depress the Record button.

2. Insert the microphone plug into the jack on the right side marked Micro.

3. Depress Record button.

4. Adjust the Volume control by speaking into the microphone from a distance of at least 12 inches. Adjust Volume control until the width of the green beam of the Magic Eye is barely perceptible.

5. At the end of the recording, depress the Stop push button.

To Record From Radio, TV, Or Phonograph

1. Insert the phonograph pickup into the jack marked Micro, using a proper adapter.

2. For radio or TV recordings, connect patch cord to the voice coil of the radio or TV speaker by means of alligator clips. Plug into jack marked Micro on the right side of the recorder.

To Use Second Track

1. Depress Stop button after all tape has been wound onto the take-up reel plate.

2. Remove full reel of tape and place on left (supply) reel plate. Place empty reel on right (take-up) reel plate.

3. Thread tape and proceed as previously described.

To Play Recordings

1. Turn On-Off switch to On.

2. Thread tape (see "Threading The Tape").

3. Set the Speed Change knob to the speed at which the recording was made.

4. Depress the Play button until it latches.

5. Adjust the Volume control for the desired listening level.

High Speed Forward Or Rewind

To play a section of tape over again, it is not necessary to play or rewind the entire tape. Depressing the Forward or Rewind button will rapidly advance or rewind the tape.

Several minutes of normal recording can be skipped in a few seconds by depressing the Forward or Rewind Button.

Tape Counter

To play back a recording at a later date, note the reading on the tape counter dial while the recording is being made or played back. Then rewind the tape until this number appears on the dial, and depress the Stop button. To play the desired selection, depress the Play button.

When starting a new reel of tape, or when re-recording a reel, reset the counter pointer to 0 by rotating the Reset knob. If all tapes are started at 0, the number for each selection can then be catalogued.

To Edit and Splice Tape

NOTE: It is impossible to edit and splice one track without affecting the second track. Therefore, limit all recordings to be edited to one track only.

1. The tape may be edited by cutting out unwanted selections or by joining selections into another sequence. Announcements can also be added between selections. Unused sections of tape may be spliced and re-used.

2. For best results, cut tape at a slight diagonal, join ends with splicing tape on the glossy side, and trim off any excess width.

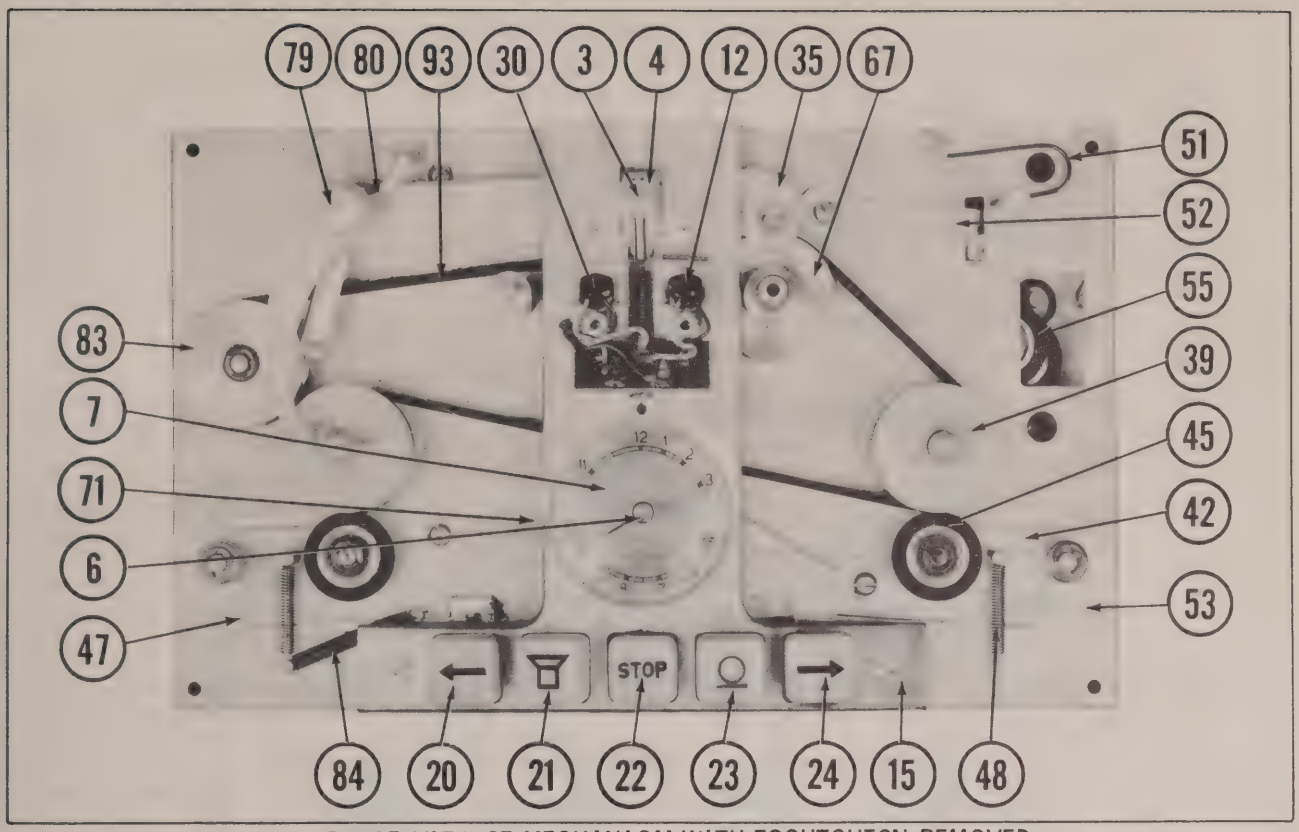


FIG. 1 TOP VIEW OF MECHANISM WITH ESCUTCHEON REMOVED

Erasing Recorded Material

Depressing the Record button places erase head (30) in operation and automatically erases any previous recordings. Material no longer needed may be erased, without recording, by turning the Volume control to minimum and depressing the Record button. To erase the second track, reverse the reels and repeat this operation.

To Play Back Through Earphones

For best results use the piezoelectric-type headset (Part No. 10231D) or equivalent, complete with plug. Insert this plug into the jack marked USCITA (Output) on the left side of the recorder. Inserting the headset plug cuts out the internal loudspeaker. Proceed as described under "To Play a Recording."

DISASSEMBLY INSTRUCTIONS

To Expose Amplifiers

1. Remove the four screws from the bottom of the case.
2. Lift the bottom off. The amplifier is now exposed for removal of tubes or other components.

To Expose Transport Mechanism

1. Remove Speed Change and Counter knobs.
2. Remove tape guide (78) and pressure roller (34).
3. Remove the four screws from top cover (96). Lift top cover off. The transport mechanism is now exposed for removal of mechanical parts. After servicing the recorder, inspect it for any sign of damage and wear. Also make certain that all parts are properly placed and adjusted. To reassemble, reverse this procedure.

CLEANING

The heads may accumulate tape coating residue, which is worn off the tape as it passes the heads. Clean the head surfaces with a soft cloth and alcohol.

LUBRICATION

Once a year, put two drops of machine oil on the motor and flywheel bearings.

Occasionally clean the foreign matter from under the plastic cover, and place a drop of oil on the sliding lever members. The basic rule is -- do not overlubricate. Keep oil and grease off all rubber idlers, belts, flywheel rim, and off any parts that might transfer oil or grease to them. Always wipe excess lubricant from lubricated parts.

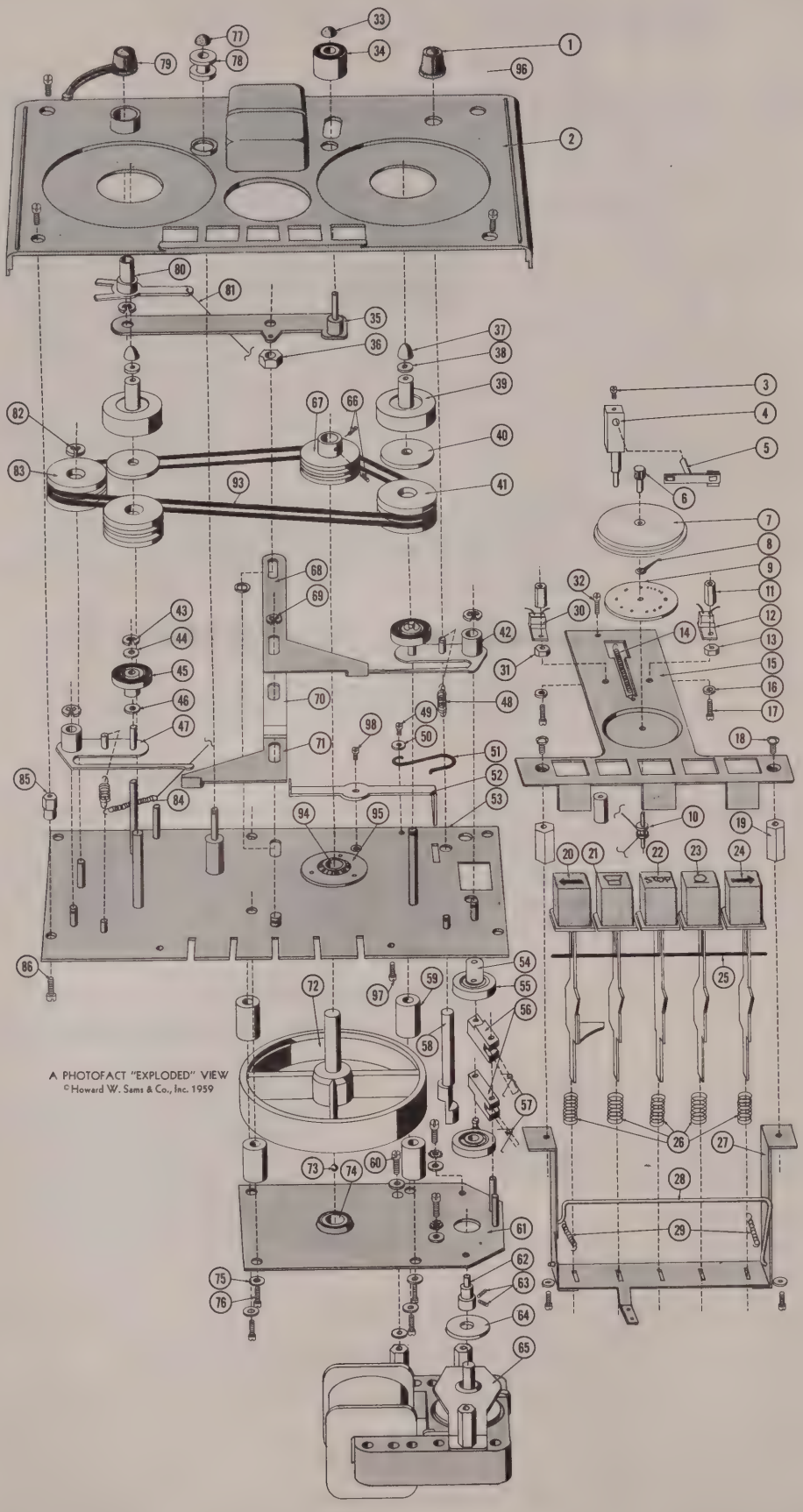


FIG. 2 EXPLODED VIEW OF TAPE TRANSPORT MECHANISM

TROUBLE CHART

Symptom	Cause	Remedy
Low output.	1. Faulty output tube EL90.	1. Replace tube EL90.
	2. Defective recording head (12).	2. Replace recording head (12).
Tape counter does not register.	1. Meter spring (84) loose or broken.	1. Connect or replace meter spring (84).
	2. Counter string (81) loose or broken.	2. Connect or replace counter string (81).
Pressure pads (5) do not contact heads.	1. Loose set screw (3).	1. Reposition pressure pads (5) and tighten set screw (3).
Pressure roller (34) does not contact capstan (72) during record and playback.	1. Tape roller pressure spring (14) loose or broken.	1. Connect or replace tape roller pressure spring (14).
Push buttons do not latch when depressed.	1. Push - button locking bridge rod springs (29) loose or broken.	1. Connect or replace push-button locking bridge rod springs (29).
Reel plates (39) do not rotate in all functions.	1. Driving belts (93) loose or broken.	1. Reposition driving belts (93), or replace if broken.
Does not change speeds.	1. Speed change springs (57) loose or broken.	1. Reposition speed change springs (57), or replace if broken.
Wow.	1. Speed change rollers (55) worn or oil-soaked.	1. Replace speed change rollers (55) if worn. If oil-soaked, clean with carbon tetrachloride and a soft cloth.
Hum.	1. Noisy tape.	1. Compare with another tape.
	2. Weak selenium rectifier.	2. Replace selenium rectifier.
	3. Shorted or leaky filter capacitors C1.	3. Replace filter capacitors C1.
	4. Poor mike cable shielding during recording.	4. Check connection of shield on mike cable.
Reels do not turn in Play or Record position. Magic Eye lights.	1. Motor rotor stuck.	1. Turn rotor with screwdriver to start. Check for foreign matter causing rotor to stick.
Reels do not turn. No background speaker noise in Play position. Tubes do not light.	1. Bad AC plug.	1. Replace plug.
	2. Defective selenium rectifier.	2. Replace selenium rectifier.

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description
1	S/71	Speed Change Knob
2	S/3	Case Top Section
3	S/78	Screw 2 x 5 Countersunk Head
4	S/26	Pressure Pad Support
5	S/29	Pressure Pad T-Arm & Pads
6	S/38	Counter Knob
7	S/41	Transparent Covering
8	S/39	Pointer
9	S/40	Counter Plate

Ref. No.	Part No.	Description
10	S/37	Meter Pin 3MA x 10
11	S/98	Screw Nut
12		Recording Head
13	S/120	Recording Head Base
14	S/54	Tape Roller Pressure Spring
15	S/35	Keyboard Plate
16	S/104	Expansion Washer
17	S/87	Screw 3 x 10 Countersunk
18	S/90	Screw 3 x 6 Countersunk

Ref. No.	Part No.	Description
19	S/36	Stud Bolt For Push Button Plate
20	S/45	Rewind Push Button With Rod
21	S/46	Playback Push Button With Rod
22	S/47	Stop Push Button With Rod
23	S/48	Record Push Button With Rod
24	S/49	Fast Forward Push Button With Rod
25	S/70	Button Stop Pin
26	S/50	Push Buttons Springs
27	S/53	Push Buttons Locking Bridge
28	S/55	Push Buttons Locking Bridge Rod
29	S/56	Push Button Locking Bridge Rod Spring
30	S/111	Erase Head
31	S/42	Erase Head Base
32	S/90	Screw 3 x 6 Countersunk and Flat Head
33	S/28	Roller Covering Cap
34	S/27	Pressure Roller
35	S/25	Pressure Roller Supporting Arm
36	S/99	Screw Nut 3MB
37	S/61	Locking Cap
38	S/102	Washer 3 x 7.2 x 0.1
39	S/60	Reel Plate
40	S/118	Plate Felt
41	S/58	Take-up and Rewind Pulleys
42	S/32	Right Side Rewinding Arm
43	S/106	"C" Washer
44	S/100	Washer 10 x 4.1 x 0.1
45	S/34	Rewinding Roller
46	S/100	Washer 10 x 4.1 x 0.1
47	S/33	Left Side Rewinding Arm
48	S/31	Rewinding Roller Spring
49	S/85	Screw 3 x 8 Countersunk Head
50	S/103	Washer 3.1 x 8 x 0.5
51	S/21	Cam Shaft Spring
52	S/9	Loose Motor Lever
53	S/8	Suspension Plate With Pins
54	S/15	Speed Change Lever (2)
55	S/18	Speed Change Rollers (2)
56	S/16	Speed Change Lever Bracket (2)
57	S/17	Speed Change Springs (2)
58	S/19	Cam Shaft
59		Motor Supporting Spacers (4)

Ref. No.	Part No.	Description
60	S/83	Screw 3 x 8 Countersunk and Flat Head (3)
61	S/12	Motor Supporting Plate
62	S/14	Motor Pulley
63	S/93	Lock Screws (2)
64	S/117	Motor Felt
65	S/109	Motor (60 Cycle)
66	S/94	Locking Screw (2)
67	S/57	Flywheel Pulley
68	S/51	Driving Lever (Top)
69	S/105	"C" Washer
70	S/52	Control Rod
71	S/51	Driving Lever (Bottom)
72	S/22	Flywheel & Capstan
73	S/112	Ball Bearing
74	S/76	Self-oiled Bearing Lower
75	S/103	Washer 3.1 x 8 x 0.5
76	S/84	Screw 3 x 8 Countersunk Head
77	S/28	Roller Covering Cap
78	S/10	Tape Guide
79	S/64	Tape Feeder
80	S/62	Counter Lever
81		Counter String
82	S/106	"C" Washer
83	S/58	Take-up and Rewind Pulley
84	S/63	Meter Spring
85	S/11	Plate Fixing Stud Bolt
86	S/86	Screw 3 x 8 Countersunk Head
87	S/1	Case Body *
88	S/2	Case Bottom *
89	S/4	Speaker Grate *
90	S/5	Transparent Cowling *
91	S/44	Plate Support *
92	S/72	On-Off-Volume Control Knob *
93	S/73	Driving Belts
94	S/75	Self-oiled Bearing Top
95	S/13	Bushing Flange
96	S/88	Screws 3 x 7 Cross Head
97	S/89	Screw 3 x 10 Countersunk Head
98	S/95	Self Tapping Screw

* Not shown on Exploded View.

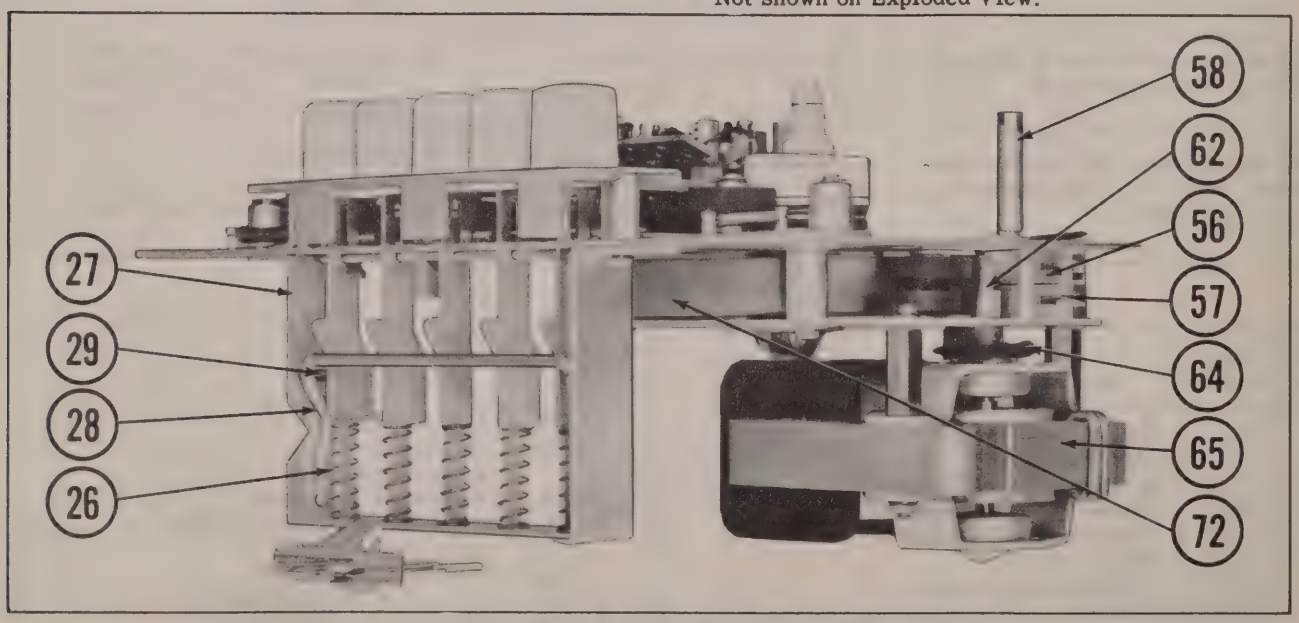
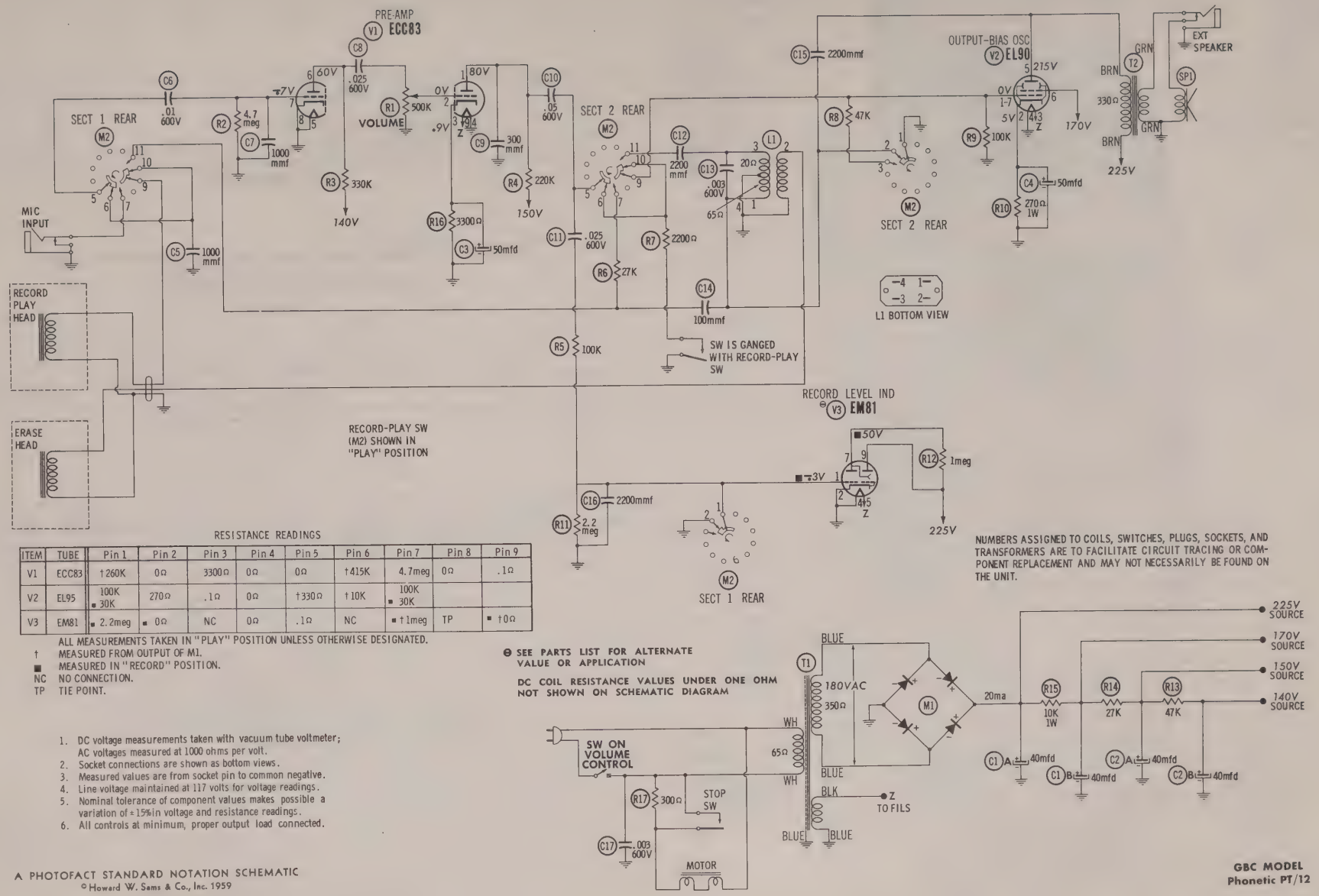


FIG. 3 SIDE VIEW OF TAPE TRANSPORT MECHANISM



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83	†260K	0Ω	3300Ω	0Ω	0Ω	†415K	4.7meg	0Ω	.1Ω
V2	EL95	100K ■ 30K	270Ω	.1Ω	0Ω	†330Ω	†10K	100K ■ 30K		
V3	EM81	■ 2.2meg	■ 0Ω	NC	0Ω	.1Ω	NC	■ †1meg	TP	■ †0Ω

ALL MEASUREMENTS TAKEN IN "PLAY" POSITION UNLESS OTHERWISE DESIGNATED.

† MEASURED FROM OUTPUT OF M1.

■ MEASURED IN "RECORD" POSITION.

NC NO CONNECTION.

TP TIE POINT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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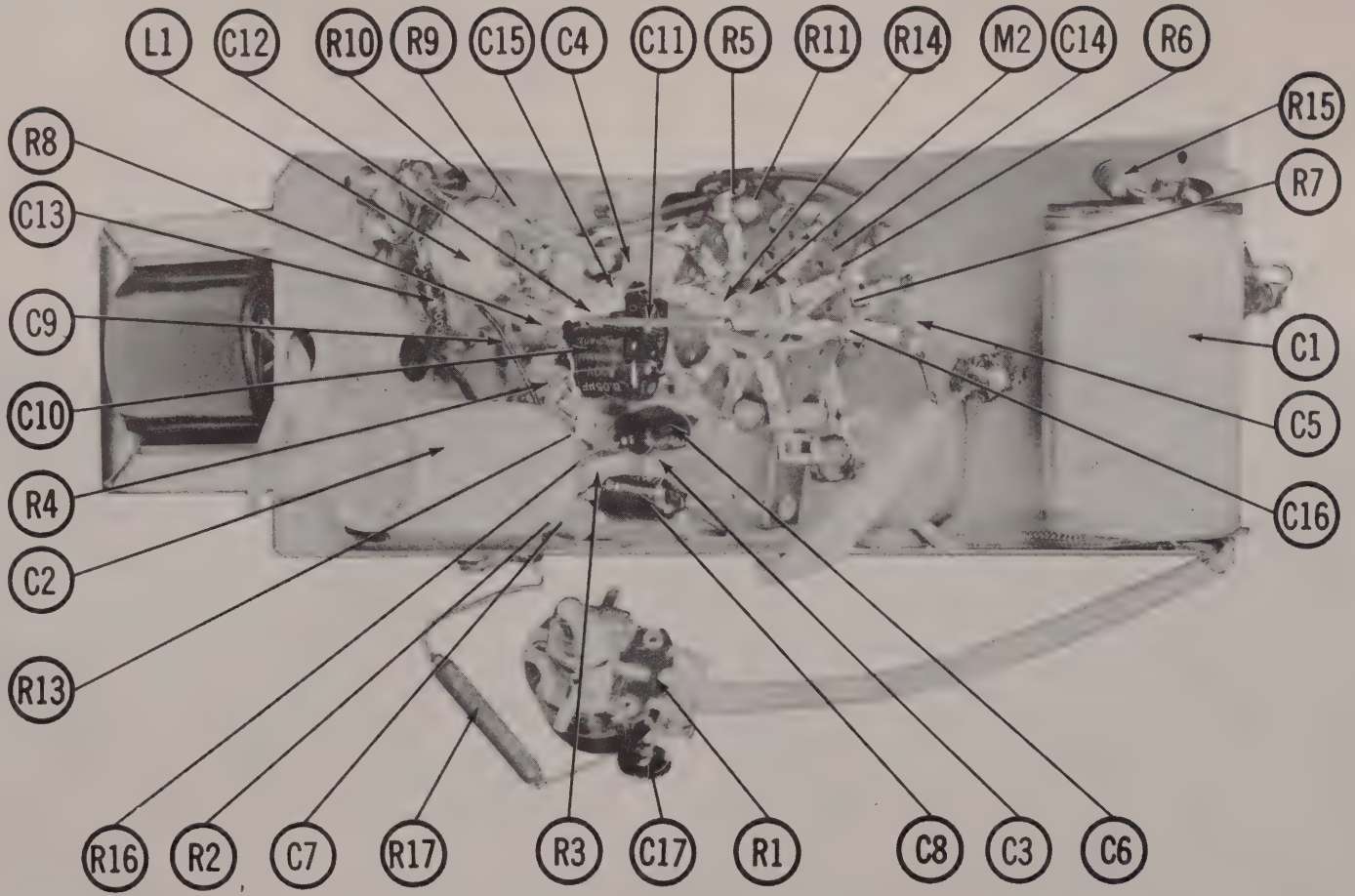
GBC MODEL
Phonetic PT/12



ELECT. CHASSIS - BOTTOM VIEW

ELECT. PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆

ITEM No.	USE	TYPE
V1	Preamplifier	ECC83/12AX7
V2	Output-Bias Osc.	EL90/6AQ5

ITEM No.	USE	TYPE
V3	Record Level Indicator	EM81 (EM80) *

* Alternate

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	G B C PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	1020	B-59	A47-500K-S	Q11-133	U50	Volume
B	Shaft			Not Req.	RS-2	Not Req.	Not Req.	
C	Switch			KR-1	SWE-12	76-1	US-26	Power Off-On

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	GBC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	40	350			BR4035	TC77	TD-40-350	TVA-1611	
B	40	350			BR4035	TC77	TD-40-350	TVA-1611	
C2A	40	200			BR4025	TC58	TDLD-22	TVA-1511	
B	40	200			BR4025	TC58		TVA-1511	
C3	50	25		SRE25V50	BBR50-25	TC29	TD-50-25	TE-1209	
C4	50	25		SRE25V50	BBR50-25	TC29	TD-50-25	TE-1209	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	4.7meg	
R3	330K	
R4	220K	
R5	100K	
R6	27K	
R7	2200Ω	

ITEM No.	RATING	REMARKS
R8	47K	
R9	100K	
R10	270Ω 1W	
R11	2.2meg	
R12	1meg	
R13	47K	

ITEM No.	RATING	REMARKS
R14	27K	
R15	10K 1W	
R16	3300Ω	
R17	300Ω	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	G B C PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	1000				SI 1000	D6-102	BYA10D1M	UC-521	5HK-D10	
C6	.01	600			P688N-01	D6-103	CUB6S1	GEM-611	6TM-S1	
C7	1000				SI 1000	D6-102	BYA10D1M	UC-521	5HK-D10	
C8	.025	600			P688N-025		CUB6S3	GEM-6125	6TM-S3	
C9	300				SI 300	D6-301	L10T33	UC-533	5GA-T30	
C10	.05	600			P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C11	.025	600			P688N-025		CUB6S3	GEM-6125	6TM-S3	
C12	2200				SI 2200	D6-222	BYA10D22	UC-5222	5HK-D22	
C13	.003	600			P688N-003	D6-302	CUB6D3	GEM-623	6TM-D3	
C14	100				SI 100	D6-101	L10T1	UC-531	5GA-T10	
C15	2200				SI 2200	D6-222	BYA10D22	UC-5222	5HK-D22	
C16	2200				SI 2200	D6-222	BYA10D22	UC-5222	5HK-D22	
C17	.003	600			P688N-003	D6-302	CUB6D3	GEM-623	6TM-D3	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		G B C PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Bias Osc.	S/137						

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	G B C PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V@ .18A	180V@ .020A	6.3V@ 1.1A							

ELECT. PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	G B C PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	9000Ω	5Ω	S/136	24S64	A-2902	AU-604	A-3849	24S64	S-53X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	G B C PART No.	QUAM PART No.	
SP1	3½"	PM	6-8Ω			

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	G B C PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.020A	S/138 ①					① Selenium

MISCELLANEOUS

ITEM No.	PART NAME	G B C PART No.	NOTES
M2	Switch		Record - Playback

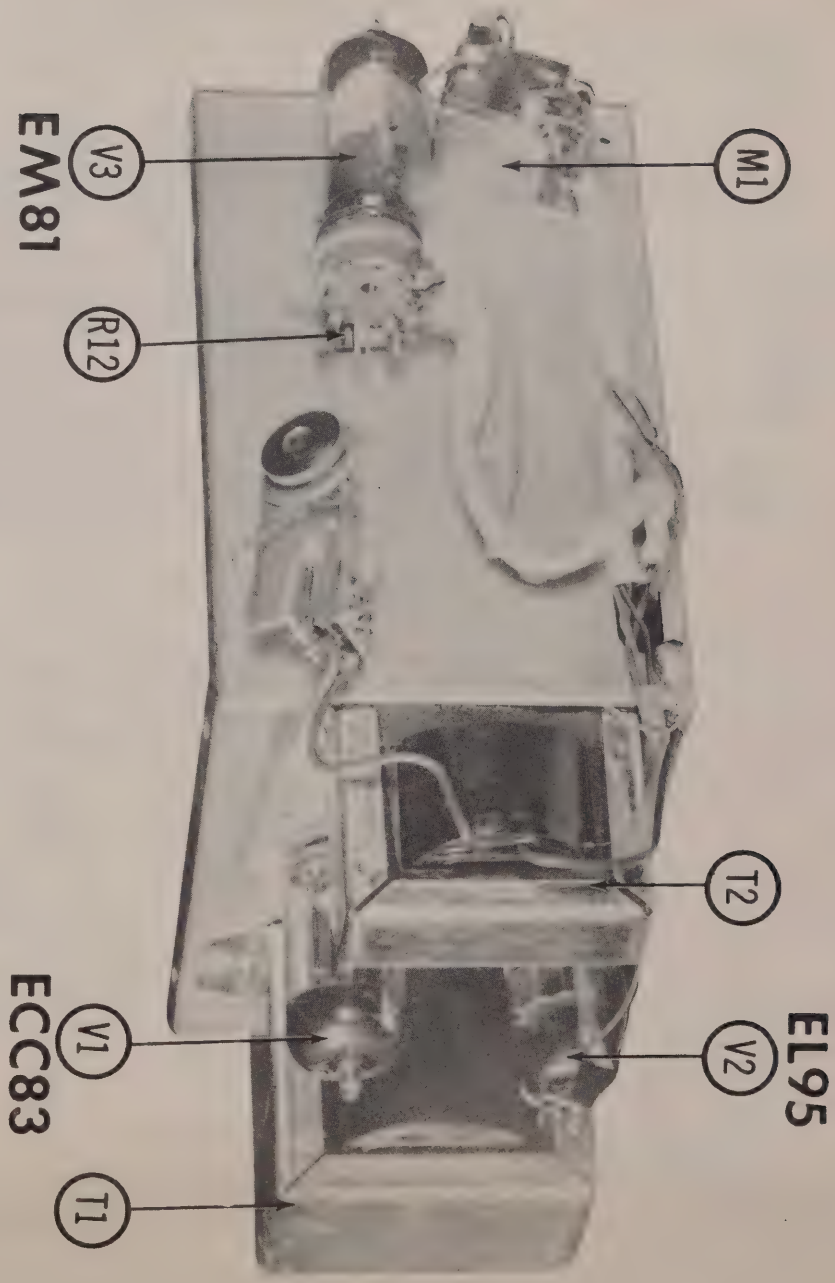
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

ELECT. CHASSIS—TOP VIEW

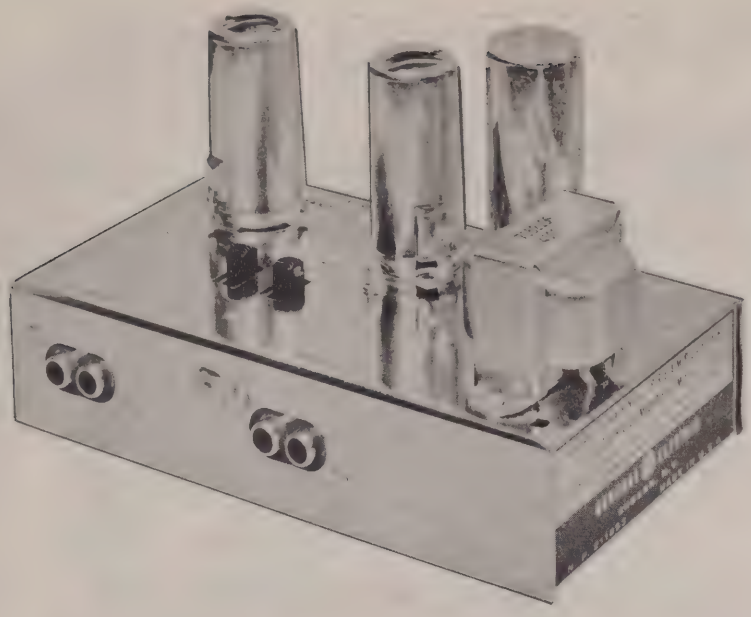


PHOTOFACT* Folder

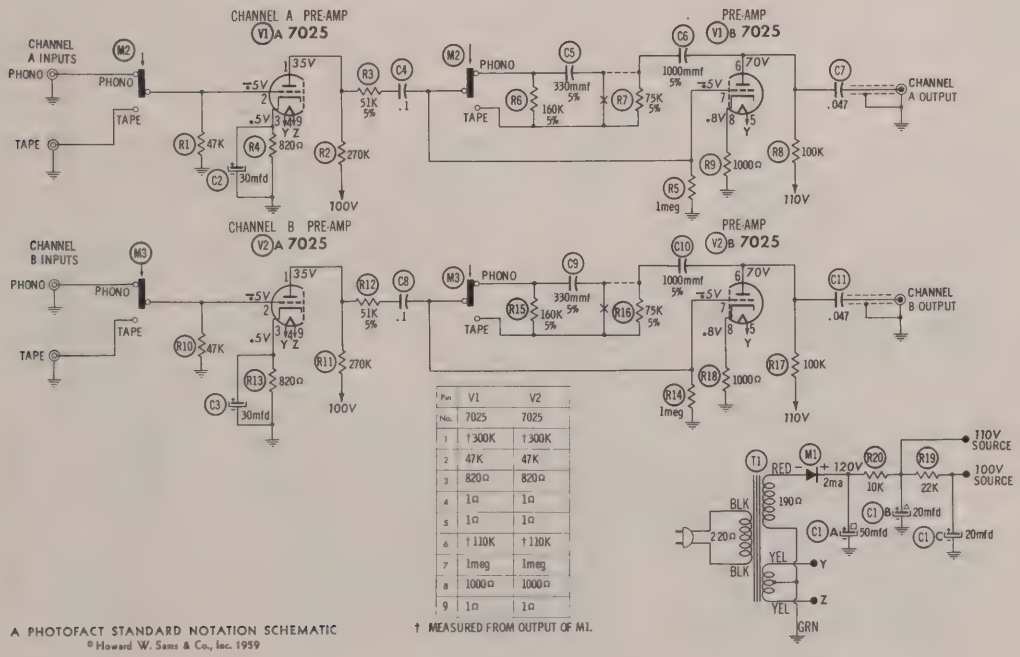
EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

GENERAL ELECTRIC MODEL MF-1

GENERAL ELECTRIC
MODEL MF-1



TRADE NAME	General Electric Model MF-1
MANUFACTURER	General Electric Co., Specialty Electronic Components Dept., W Genesee St., Auburn, N. Y.
TYPE SET	AC Operated Two Channel Tape-Phono Stereo Preamplifier
POWER SUPPLY	105 - 125 Volts AC, 60 Cycles RATING 8 Watts, .12 Amp. @ 117 Volts AC



Pin No.	V1	V2
	7025	7025
1	†300K	†300K
2	47K	47K
3	820Ω	820Ω
4	1Ω	1Ω
5	1Ω	1Ω
6	†110K	†110K
7	1meg	1meg
8	1000Ω	1000Ω
9	1Ω	1Ω

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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† MEASURED FROM OUTPUT OF M1.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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JU186

SET 460 FOLDER 8

PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Channel A Preamplifier	7025 (12AX7) *	V2	Channel B Preamplifier	7025 (12AX7) *

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	G.E. PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■50	150		AFH3-08	XC0071	FP311.55	TMT-7	TVL-3440.4	
B	▲20	150							
C	20	150							
C2	30	6		XPP-6030	NLW30-6	TT6X30	ML30-6	TE-1092	
C3	30	6		XPP-6030	NLW30-6	TT6X30	ML30-6	TE-1092	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	G.E. PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	.1	200			P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C5	330		5%		1464-00033		22R5T33		MS-333	
C6	1000		5%		1469-001		1R5D1		MS-110	
C7	.047	200			P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C8	.1	200			P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C9	330		5%		1464-00033		22R5T33		MS-333	
C10	1000		5%		1469-001		1R5D1		MS-110	
C11	.047	200			P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R1	47K	
R2	270K	
R3	51K 5%	
R4	820Ω	
R5	1meg	
R6	160K 5%	
R7	75K 5%	

ITEM No.	RATING	REMARKS
R8	100K	
R9	1000Ω	
R10	47K	
R11	270K	
R12	51K 5%	
R13	820Ω	
R14	1meg	

ITEM No.	RATING	REMARKS
R15	160K 5%	
R16	75K 5%	
R17	100K	
R18	1000Ω	
R19	22K	
R20	10K	

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	G.E. PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V@ .12A	115V@ .002A	6.3 VCT @ .6A	7152105						

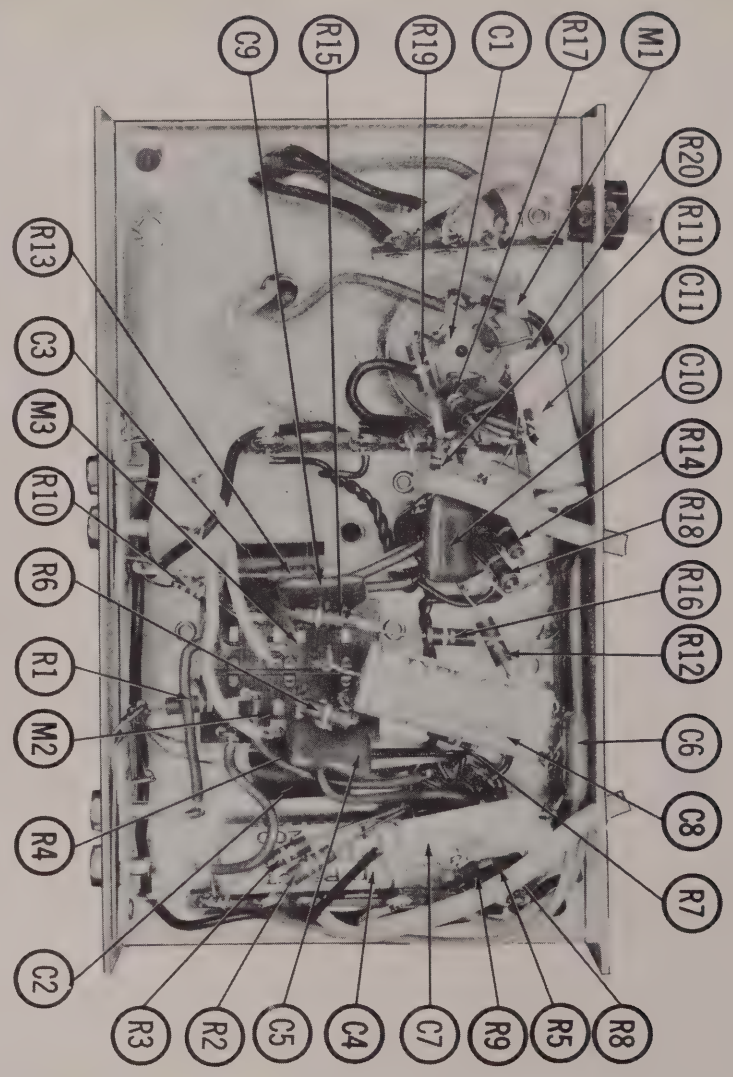
RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	G.E. PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.002A	①					① Selenium Type

MISCELLANEOUS

ITEM No.	PART NAME	G.E. PART No.	NOTES
M2	Switch		Phono-Tape (DPDT, Slide Type)
M3	Switch		Phono-Tape (DPDT, Slide Type)

CHASSIS BOTTOM VIEW



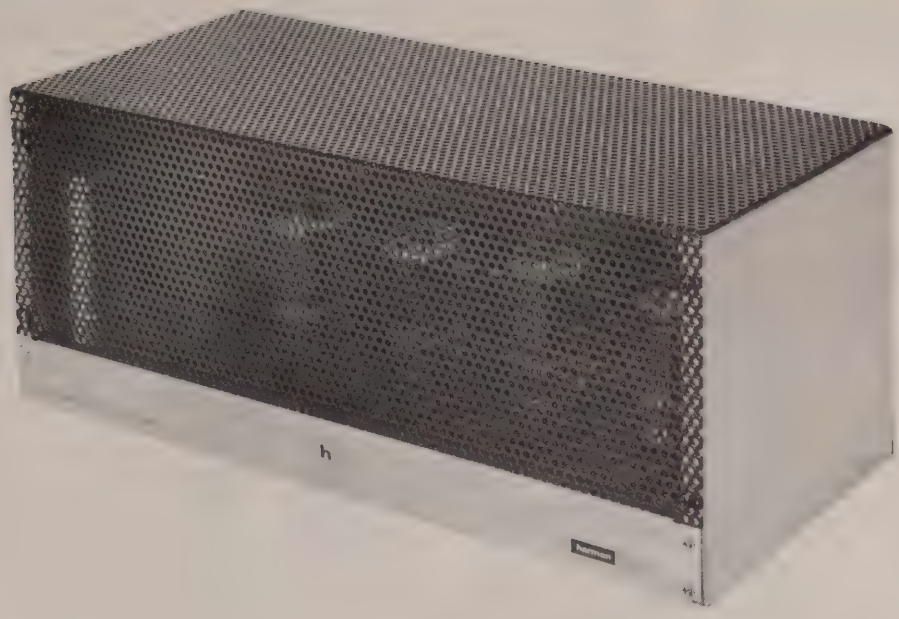
WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power-Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

PHOTOFACT* Folder

HARMAN-KARDON
MODEL HK-250

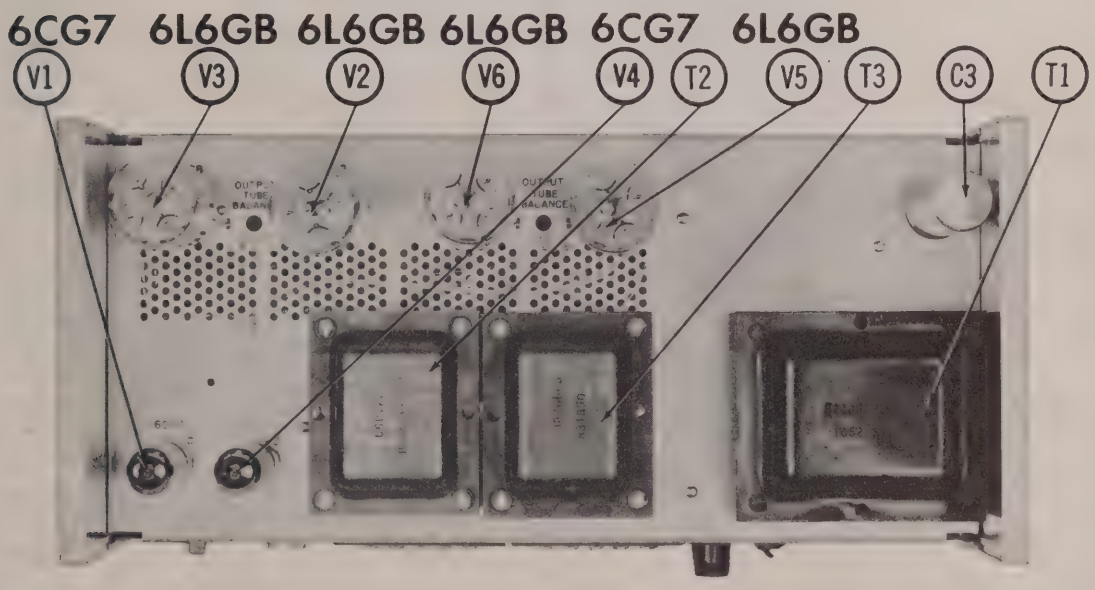
HARMAN-KARDON
MODEL HK-250



TRADE NAME	Harman-Kardon Model HK250
MANUFACTURER	Harman-Kardon, Inc., 520 Main St., Westbury, L. I., N. Y.
TYPE SET	AC Operated 6 Tube Stereo Amplifier
POWER SUPPLY	110 - 120 Volts AC, 60 Cycle RATING 120 Watts, 1.26 Amp. @117 Volts AC

OUTPUT TUBE BALANCE ADJUSTMENT (R1, R2)

Adjust each Balance control for minimum hum as heard through the speaker system. If no hum is audible, set the controls to their mid-position. For precise adjustment, an inter-modulation distortion meter should be used, setting the controls for minimum IM.



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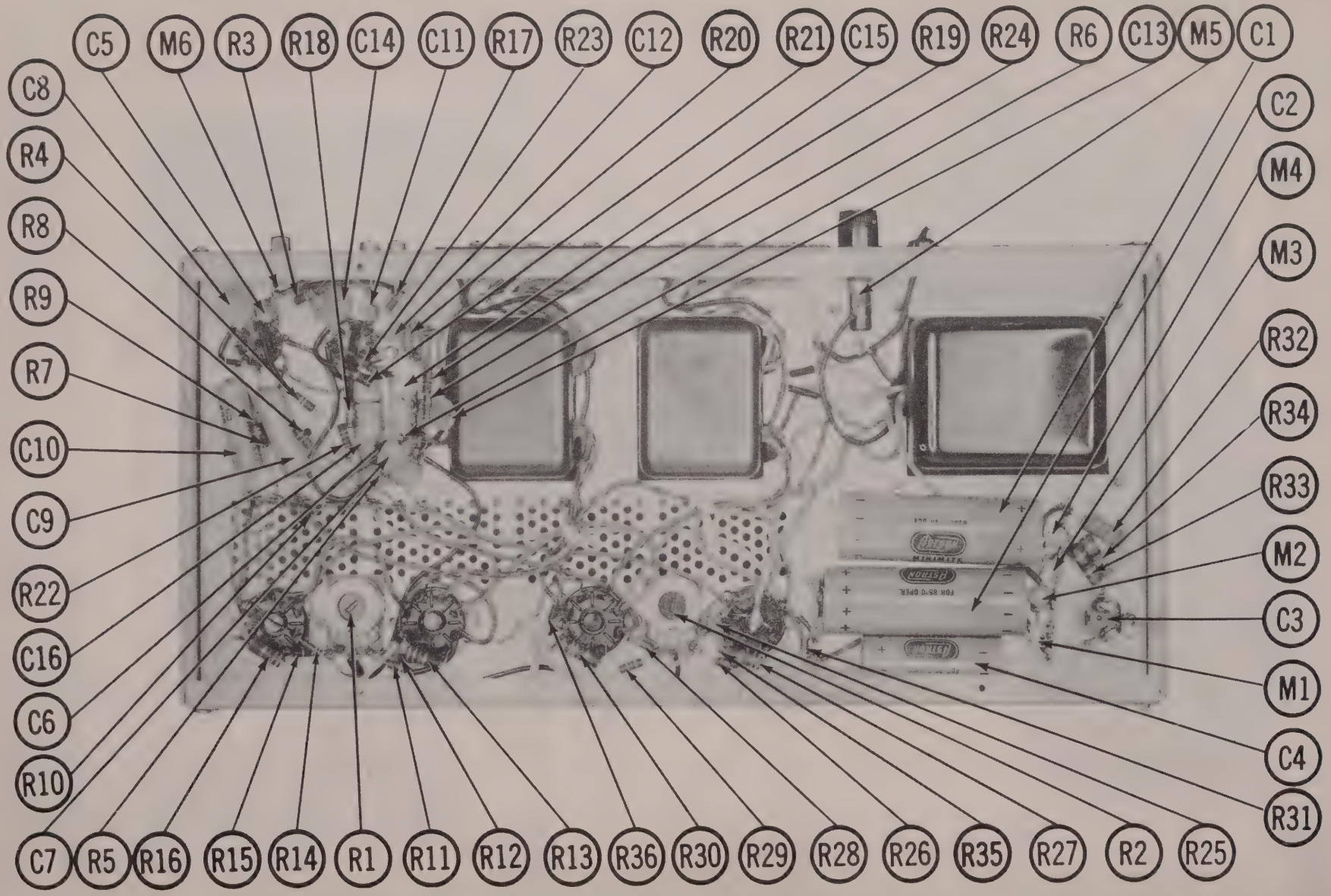


CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Right Channel AF Amp. - Phase Inv.	6CG7	V4	Left Channel AF Amp. - Phase Inv.	6CG7
V2	Right Channel Output	6L6GB	V5	Left Channel Output	6L6GB
V3	Right Channel Output	6L6GB	V6	Left Channel Output	6L6GB

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Harman-Kardon PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1	125	250	JE2382720		BBRT7V4125			TVAS-1524*	
C2	125	250	JE2382720		BBRT7V4125			TVAS-1524*	
C3A	20	450	JE2382669	AFH3-166	C1300	FP387.1	TMS-55	TVL-1714	
B	150	50					TD-150-50	TVA-1311	
C4A	8	450	JE2483007	PRS450V8-8	BBRD8D45	TCD71	TDLD-24	TVA-2720	
B	8	450							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA Harman-Kardon PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	100		N150							
C6	330				BPD-00033	DD-331	L10T33	B-333	5GA-T33	
C7	4700				BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	
C8	20000				BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C9	.05	600			P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C10	.05	600			P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C11	100		N150							
C12	330				BPD-00033	DD-331	L10T33	B-333	5GA-T33	
C13	4700				BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	
C14	20000				BPD-02	DD-203	BYB6S2	B-120	5HK-S2	
C15	.05	600			P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	
C16	.05	600			P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Harman-Kardon PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	100Ω	1/2	RVCOM2569	B-1 *			U-1 *	Balance, Right Channel
R2	100Ω	1/2	RVCOM2569	B-1 *			U-1 *	Balance, Left Channel

* Enlarge mounting hole.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R3	330K	
R4	56K	
R5	820Ω	
R6	12K	
R7	1meg	
R8	22K	Note 1
R9	1000Ω	
R10	22K	Note 1
R11	330K	
R12	180Ω	
R13	330Ω 1W	
R14	330K	

ITEM No.	RATING	REMARKS
R15	180Ω	
R16	330Ω 1W	
R17	330K	
R18	56K	
R19	820Ω	
R20	12K	
R21	1meg	
R22	22K	Note 1
R23	1000Ω	
R24	22K	Note 1
R25	330K	
R26	180Ω	

ITEM No.	RATING	REMARKS
R27	330Ω 1W	
R28	330K	
R29	180Ω	
R30	330Ω 1W	
R31	4700Ω	
R32	6800Ω 2W	
R33	68Ω 1W	
R34	68Ω 1W	
R35	68Ω	
R36	68Ω	

Note 1. R8, R10, R22 & R24 matched within 2%.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA Harman-Kardon PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⓐ 1.26A	150V ⓐ .720A (AC)	6.3V ⓐ 4.5A	FT2382665						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Harman-Kardon PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	7000Ω CT	32Ω Taps ⓐ 16Ω, 8Ω, 4Ω	FT2382666							
T3	7000Ω CT	32Ω Taps ⓐ 16Ω, 8Ω, 4Ω	FT2382666							

RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA Harman-Kardon PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.165A	Z2382924①	HA504①	SD-500①	40K①	SR500①	① Silicon Type
M2	.165A	Z2382924①	HA504①	SD-500①	40K①	SR500①	
M3	.165A	Z2382924①	HA504①	SD-500①	40K①	SR500①	
M4	.165A	Z2382924①	HA504①	SD-500①	40K①	SR500①	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA Harman-Kardon PART No. FUSE	Harman-Kardon PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M5	3AG	4A			312004. (3AG 4A 250V)	342001	AGC 4	HKP

MISCELLANEOUS

ITEM No.	PART NAME	Harman-Kardon PART No.	NOTES
M6	Switch	ES771372	Mon-Stereo (SPDT, Slide Type)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

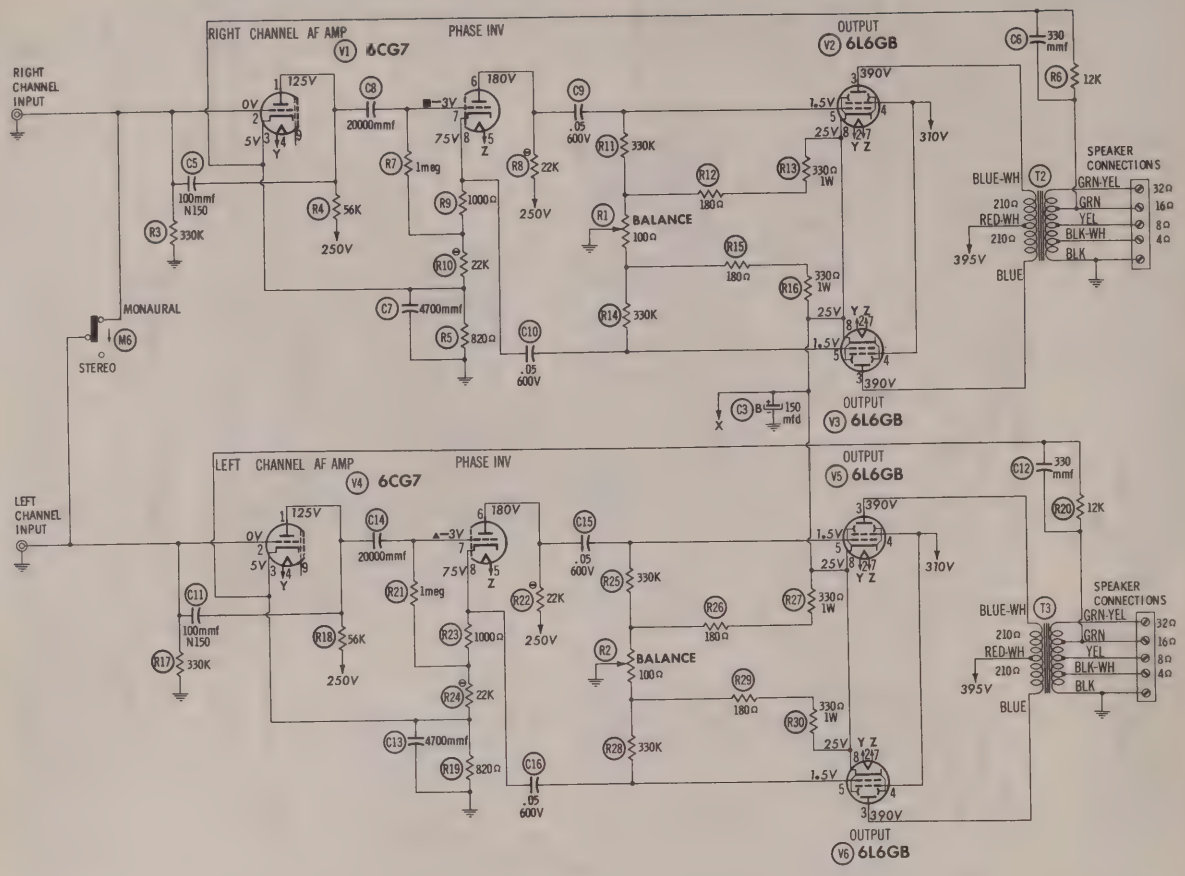
WIRING DATA

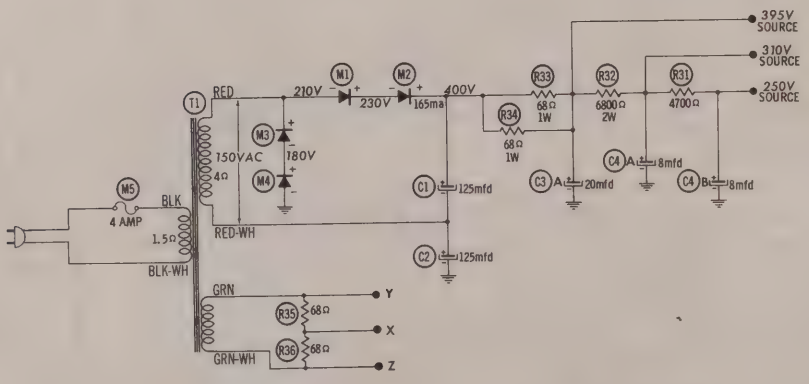
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8538 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

HARMAN-KARDON
MODEL HK-250

FOLDER 9





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6CG7	†67K	330K	820Ω	180Ω	180Ω	†33K	1meg	24K	180Ω
V2	6L6GB	TP	180Ω	†245Ω	†6800Ω	330K	TP	180Ω	150Ω	
V3	6L6GB	TP	180Ω	†245Ω	†6800Ω	330K	TP	180Ω	150Ω	
V4	6CG7	†67K	330K	820Ω	180Ω	180Ω	†33K	1meg	24K	180Ω
V5	6L6GB	TP	180Ω	†245Ω	†6800Ω	330K	TP	180Ω	150Ω	
V6	6L6GB	TP	180Ω	†245Ω	†6800Ω	330K	TP	180Ω	150Ω	

† MEASURED FROM OUTPUT OF M1
■ MEASURED FROM PIN 8 OF V1
▲ MEASURED FROM PIN 8 OF V4
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

❶ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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HARMAN-KARDON
MODEL HK-250

PHOTOFACT* Folder

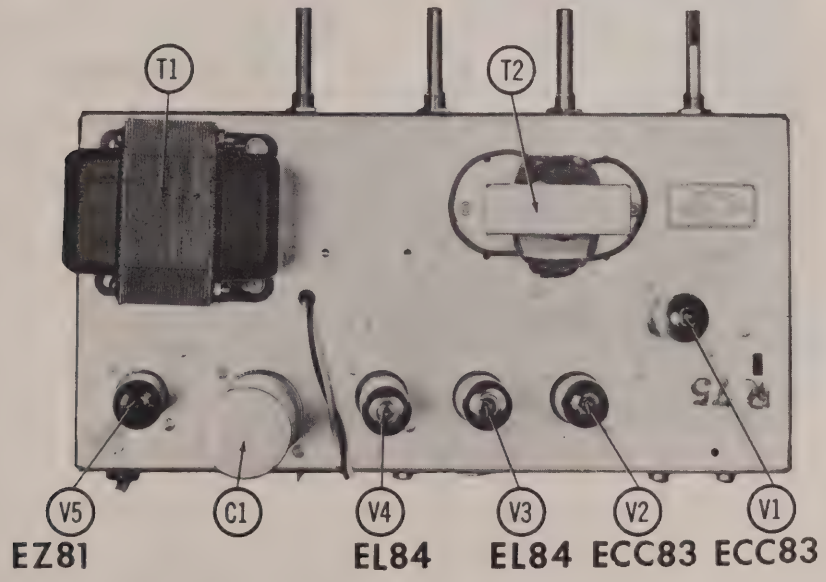
HOFFMAN MODELS 2SA Series, 3SA Series (Ch. 1132)

HOFFMAN MODELS 2SA Series, 3SA Series (Ch. 1132)

MODEL B-3SA

HOFFMAN MODELS 2SA Series, 3SA Series (Ch. 1132)

TRADE NAME	Hoffman Models B-2SA, B-3SA, C-2SA, M-2SA, M-3SA, SP-2SA, SP-3SA, W-2SA, W-3SA(Chassis 1132)
MANUFACTURER	Hoffman Radio Corp., 3761 S. Hill Street, Los Angeles 7, California
TYPE SET	AC Operated 5 Tube Audio Amplifier
POWER SUPPLY	110 - 120 Volts AC, 60 Cycles RATING 57 Watts, .57 Amp. @ 117 Volts AC



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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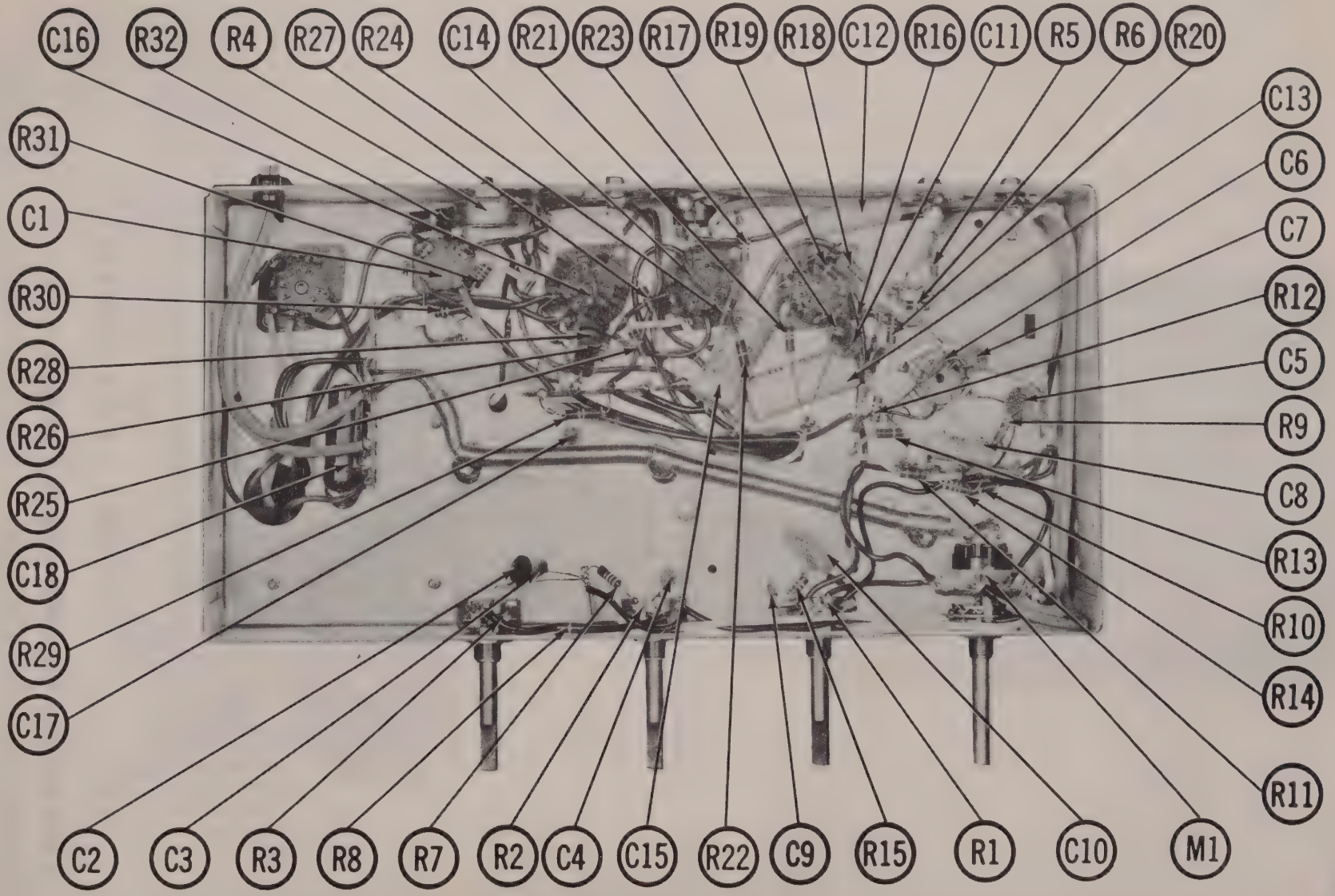
JX355

SET 460 FOLDER 10



CHASSIS-BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE (CBS / GENERAL ELECTRIC / RAYTHEON / SYLVANIA)
V1	Preamp. -Cath. Follower	ECC83/12AX7(7025)*
V2	AF Amp. -Phase Inv.	ECC83/12AX7(7025)*
V3	Output	EL84/6BQ5
V4	Output	EL84/6BQ5
V5	Rectifier	EZ81/6CA4

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	HOFFMAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	▲80	400	857105	AFH4-58-75	C0370	FP378	TMT-34	TVLS-4657.8*	
B	■40	350			BR2035	TC65	TD-20-350		
C	▲20	300							
D	20	300							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	HOFFMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	82		10%	851120	DI-82	DD-820	L10Q82	CNO-482	MS-482	
C3	330		10%	851121	DI-330	MD-331	L10T33	JL-330	MS-333	
C4	470		10%	851122	DI-470	MD-471	5R5T47	JL-470	MS-347	
C5	3300			851123	BPD-0033	DD-332	BYA10D33	B-233	5HK-D33	
C6	4700			851126	BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	
C7	47		10%	848401	DI-47	DD-470	L10Q47	CNO-447	MS-447	
C8	.047	200		866121	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C9	1000			851003	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C10	20000			851109	BPD-02	DD-203	BYA6S2	B-120	5HK-S2	
C11	4700			851101	BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	
C12	.047	200		866121	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C13	.1	600		866325	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C14	1500	1500		851115	HVD-15-1500	DD30-152	HVC16D15	2HV-215	20GA-D15S*	
C15	.1	600		866325	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C16	1500	1500		851115	HVD-15-1500	DD30-152	HVC16D15	2HV-215	20GA-D15S*	
C17	680		10%	851118	DI-680	MD-681	1R5T68	JL-368	MS-368	
C18	.047	600		870221	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	HOFFMAN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	100K	½	800062	BT-39				Loudness, Tap @ 60K
R2A	2meg	½	800004	B-75	A47-2meg-S	Q11-139	U55	Bass
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R3A	2meg	½	800004	B-75	A47-2meg-S	Q11-139	U55	Treble
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R4A	250Ω	½	800014	AB-2		B11-201	R250L	Hum Balance
B	Shaft			AK-1		SK-1	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R5	820K	
R6	100K	
R7	330K	
R8	1.2meg	
R9	3.3meg	
R10	22Ω	
R11	1.2meg	
R12	220K	
R13	2200Ω	
R14	33K	
R15	3300Ω	
R16	1.2meg	
R17	100K	
R18	1200Ω	
R19	1.2meg	
R20	68K	
R21	100K	
R22	1000Ω	
R23	330K	
R24	220Ω	
R25	1000Ω	
R26	330K	
R27	220Ω	
R28	160Ω 5% 2W	
R29	22K	
R30	47K	
R31	33K	
R32	120Ω 2W	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	RATING SEC. 4	RATING SEC. 5	HOFFMAN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .57A	580 VCT @ .072A	6.3V @ .9A	6.3V @ 2.2A			716007						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	HOFFMAN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	6000Ω CT	14-16Ω	724028	24S14	A-3027	AU-609	A-3870	24S14	S-55X	

MISCELLANEOUS

ITEM No.	PART NAME	HOFFMAN PART No.	NOTES
M1	Switch	902023	Selector

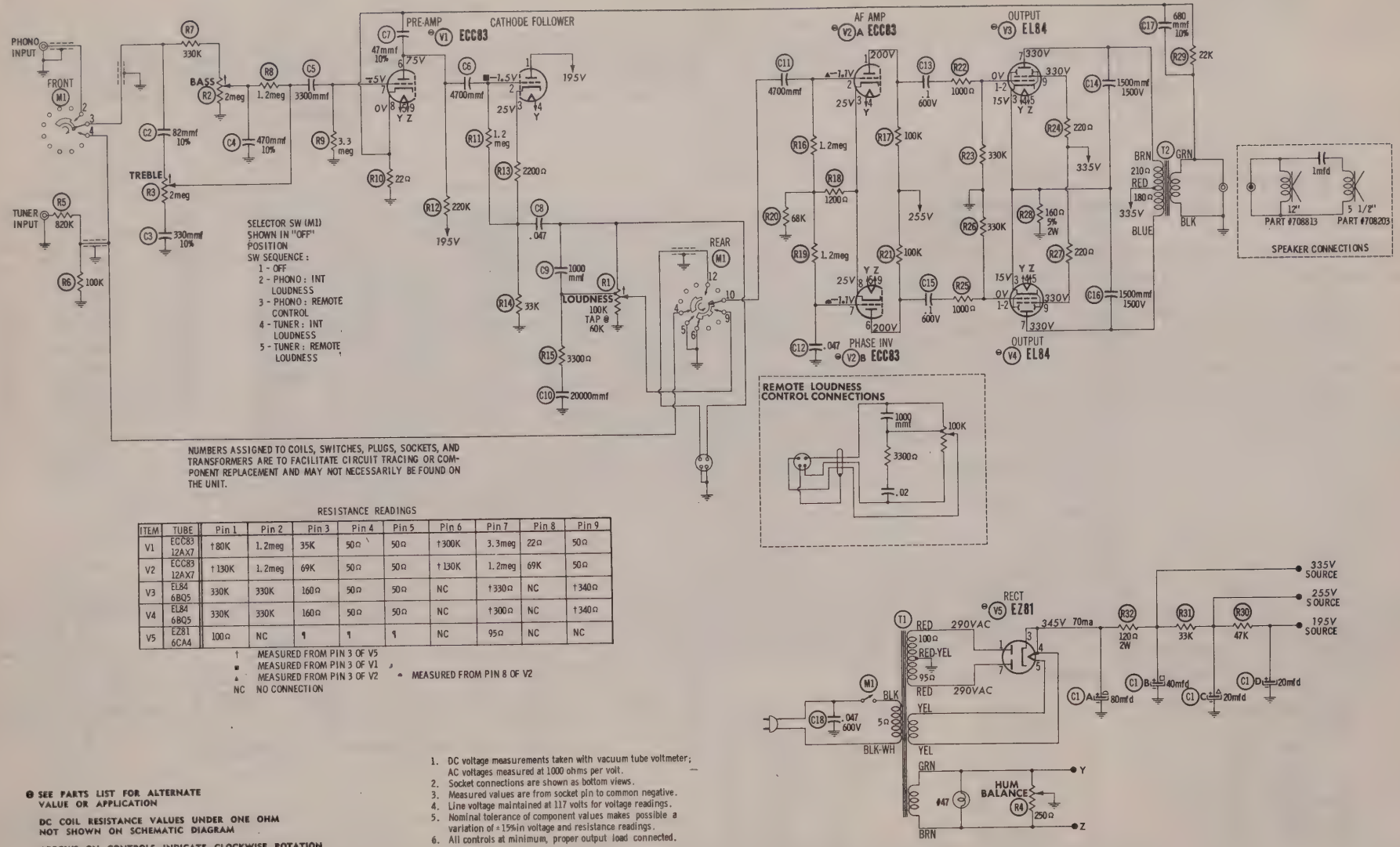
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	500053	
Cabinet	390016	

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83 12AX7	†80K	1.2meg	35K	50Ω	50Ω	†300K	3.3meg	22Ω	50Ω
V2	ECC83 12AX7	†130K	1.2meg	69K	50Ω	50Ω	†130K	1.2meg	69K	50Ω
V3	EL84 6BQ5	330K	330K	160Ω	50Ω	50Ω	NC	†330Ω	NC	†340Ω
V4	EL84 6BQ5	330K	330K	160Ω	50Ω	50Ω	NC	†300Ω	NC	†340Ω
V5	EZ81 6CA4	100Ω	NC	¶	¶	¶	NC	95Ω	NC	NC

† MEASURED FROM PIN 3 OF V5
■ MEASURED FROM PIN 3 OF V1
▲ MEASURED FROM PIN 3 OF V2
◆ MEASURED FROM PIN 8 OF V2
NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

❶ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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HOFFMAN MODELS 2SA Series, 3SA Series (Ch. 1132)

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

LAFAYETTE MODEL LT-30

LAFAYETTE MODEL LT-30

LAFAYETTE MODEL LT-30

TRADE NAME	Lafayette Model LT-30
SUPPLIER	Lafayette Radio, 165-08 Liberty Ave., Jamaica 33, N.Y.
TYPE SET	AC Operated 3 Tube Preamplifier
POWER SUPPLY	105 - 125 Volts AC, 50-60 Cycles RATING 12 Watts, .17 Amp. @117 Volts AC

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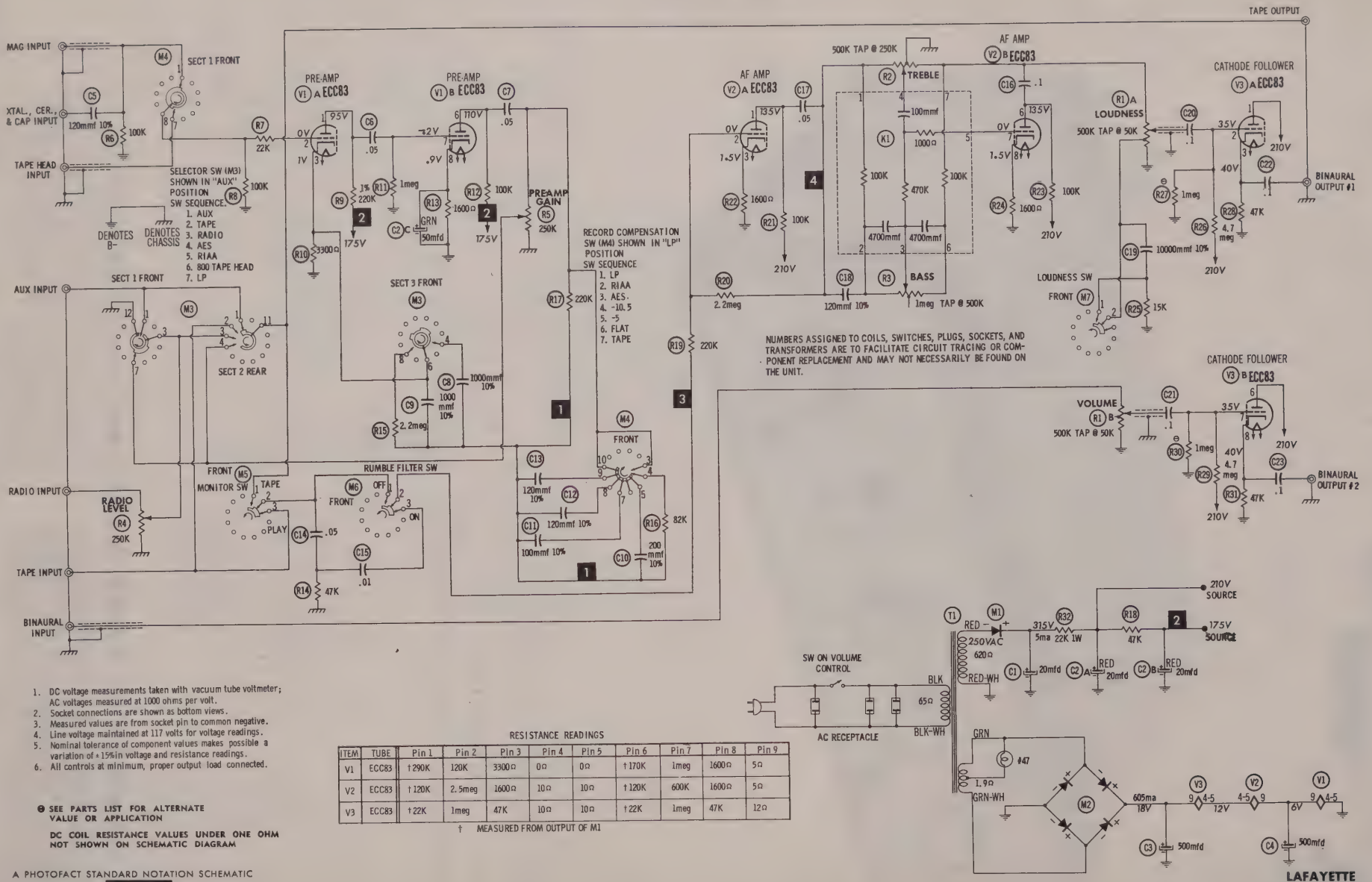

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

❷ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	ECC83	†290K	120K	3300Ω	0Ω	0Ω	†170K	1meg	1600Ω	5Ω
V2	ECC83	†120K	2.5meg	1600Ω	10Ω	10Ω	†120K	600K	1600Ω	5Ω
V3	ECC83	†22K	1meg	47K	10Ω	10Ω	†22K	1meg	47K	12Ω

† MEASURED FROM OUTPUT OF M1

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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LAFAYETTE MODEL LT-30

PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆

ITEM No.	USE	TYPE
V1	Preamplifier	ECC83 (12AX7)*
V2	AF Amplifier	ECC83 (12AX7)*
V3	Cathode Follower-Binaural Cathode Follower	ECC83 (12AX7)*

* Alternate

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA LAFAYETTE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1	20	350	12-5	PRS450V20	BR2035	TC65	TD-20-350	TVA-1608	
C2A	20	350	12-13	PR4-185	BBRD2245	TCD65	TDLD-28	TVA-2730	
B	20	350			BBR50-25	TC29	TD-50-25	TVA-1206	
C	50	10							
C3	500	50	12-14	PRS50V500	BR5005	TC2505		TVA-1315	
C4	500	25	12-10	PRS25V500	BR5002	TC2505	TD-500-25	TVA-1209	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA LAFAYETTE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	120		10%	12-1	DI-120	DD-121	L10T12	JL-312	5GA-T12S 10%*	
C6	.05	400		12-11	P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C7	.05	400		12-11	P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C8	1000		10%	12-2	DI-1000		PM6D1	JL-312	5GA-D1S 10%*	
C9	1000		10%	12-2	DI-1000		PM6D1	JL-312	5GA-D1S 10%*	
C10	200		10%	12-4	DI-200	DD-201	L10T2		5GA-T2S 10%*	
C11	100		10%	12-3	DI-100	DD-101	L10T1	CNO-310	5GA-T1S 10%*	
C12	120		10%	12-1	DI-120	DD-121	L10T12	CNO-312	5GA-T12S 10%*	
C13	120		10%	12-1	DI-120	DD-121	L10T12	CNO-312	5GA-T12S 10%*	
C14	.05	200		12-6	P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C15	.01	200		12-7	P288N-01	DD-103	CUB2S1	GEM-411	2TM-S1	
C16	.1	400		12-12	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C17	.05	400		12-11	P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C18	120		10%	12-1	DI-120	DD-121	L10T12	CNO-412	5GA-T12	
C19	10000		10%	12-8			PM6S1			
C20	.1	200		12-9	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C21	.1	200		12-9	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C22	.1	200		12-9	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C23	.1	200		12-9	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA LAFAYETTE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K	1/2	11-4	F1-47				Loudness, Tap@50K
B	500K	1/2		R2-47		† QJ1106		Volume, Tap@50K
C	Switch			KR-1				Off-On
R2A	500K	1/2	11-3	BT-65	A47F5-500K	Q19-133X	UT-431	Treble, Tap@250K
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R3A	1meg	1/2	11-2	BT-71	A47F5-1meg	Q19-137X	UT-443	Bass, Tap@500K
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R4A	250K	1/2	11-1	AB-51	A47-250K-Z	B13-130	U44	Radio Level
B	Shaft			AK-1	FKS-1/4	SK2	Not Req.	
R5A	250K	1/2	11-1	AB-51	A47-250K-Z	B13-130	U44	Preamp. Gain
B	Shaft			AK-1	FKS-1/4	SK2	Not Req.	

† "Concentrikit" equivalent: K-2 Kit with base elements and shafts: B18-133X, P1-106 (Panel) B18-133X, R1-122 (Rear) 76-1 (Switch)

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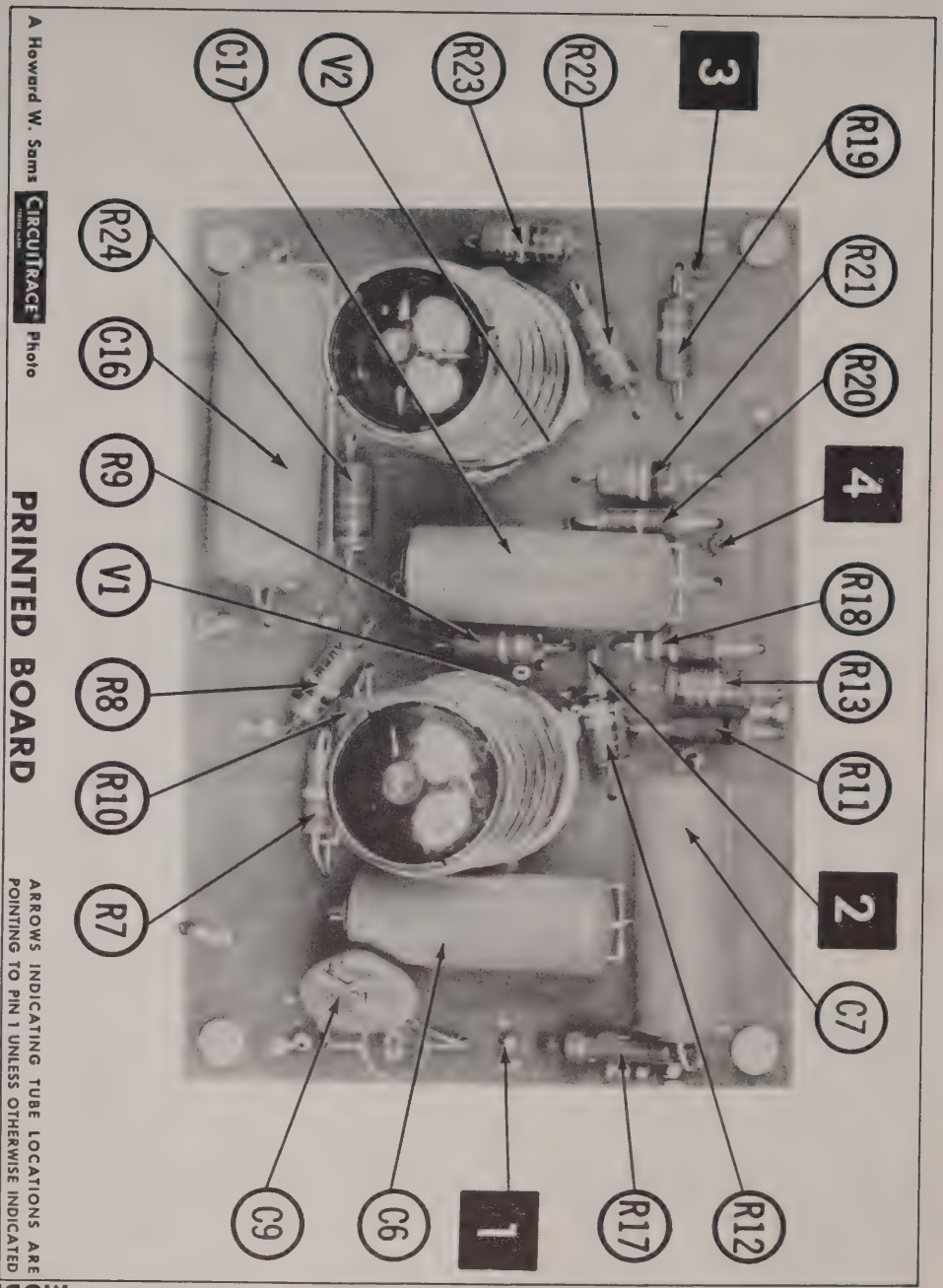
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



LAFAYETTE MODEL LT-30

FOLDER 11

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R6	100K	
R7	22K	
R8	100K	
R9	220K 1%	
R10	3300Ω	
R11	1meg	
R12	100K	
R13	1600Ω	
R14	47K	

ITEM No.	RATING	REMARKS
R15	2.2meg	
R16	82K	
R17	220K	
R18	47K	
R19	220K	
R20	2.2meg	
R21	100K	
R22	1600Ω	
R23	100K	

ITEM No.	RATING	REMARKS
R24	1600Ω	
R25	15K	
R26	4.7meg	
R27	1meg(100K)*	
R28	47K	
R29	4.7meg	
R30	1meg(100K)*	
R31	47K	
R32	22K 1W	

*Alternate

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	LAFAYETTE PART No.	REPLACEMENT DATA
K1	Tone Compensation	100mmf, 4700mmf, 4700mmf, 1000Ω, 100K, 100K, 470K		Centralab PC-190 Sprague TCS-16

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	LAFAYETTE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V Ⓐ .17A	250V Ⓐ .005A	16V Ⓐ .300A Tap Ⓐ 6.3V Ⓐ 15A	15-1						

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA				NOTES
	CURRENT (Measured)	LAFAYETTE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M1	.005A	17-2 ①		T065	026-20H-Q	① Selenium Type
M2	.605A	17-1 ①		C1B	604B	

MISCELLANEOUS

ITEM No.	PART NAME	LAFAYETTE PART No.	NOTES
M3	Switch	14-1	Selector
M4	Switch	14-2	Record Compensation (Roll Off)
M5	Switch	14-3	Monitor
M6	Switch	14-3	Rumble Off-On
M7	Switch	14-3	Loudness Off-On

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

WIRING DATA

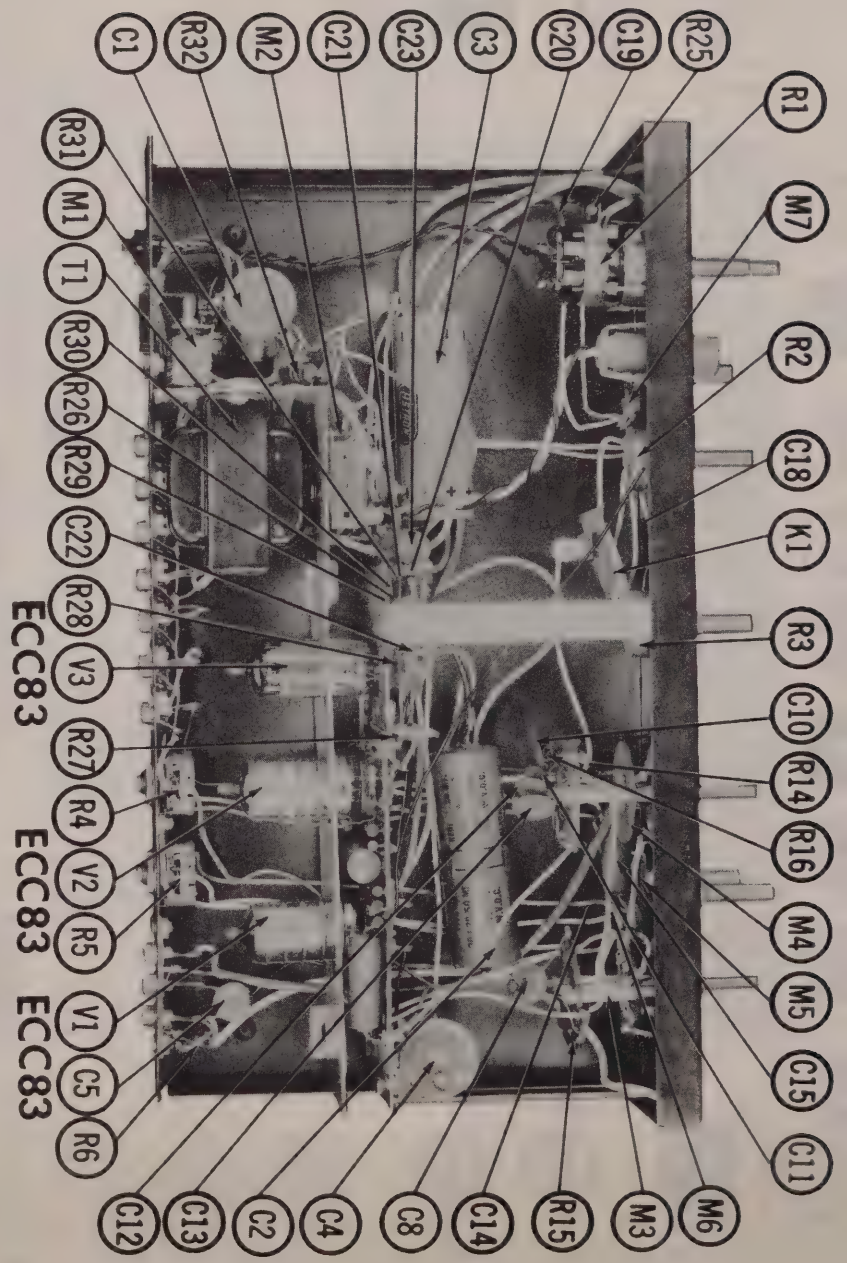
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

Low-Loss Shielded Lead (Interconnecting) .....Use BELDEN No. 8401

Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS—TOP VIEW



PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

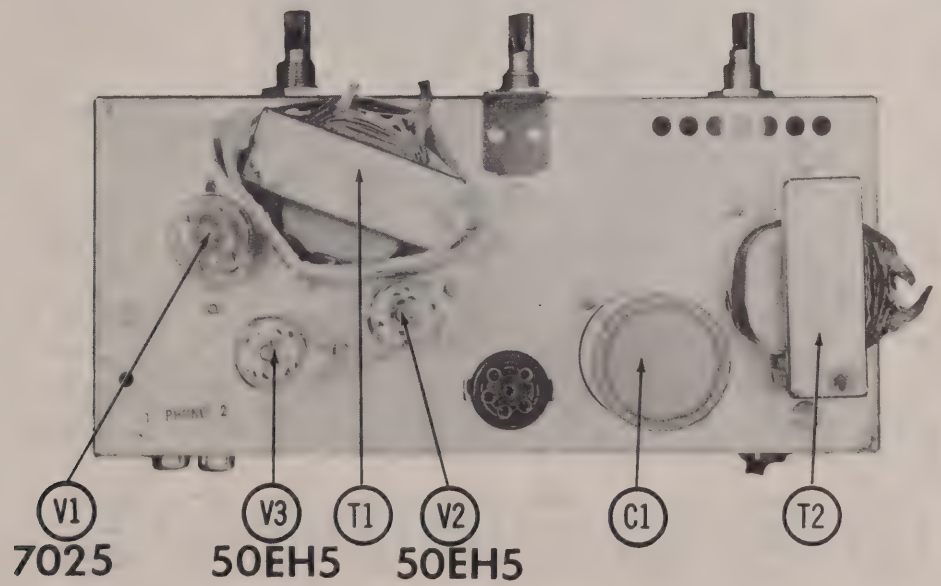
MAGNAVOX CHASSIS AMP-194-00

MAGNAVOX CHASSIS
AMP-194-00

REPRESENTATIVE MODEL
USING CHASSIS AMP-194-00

MAGNAVOX CHASSIS
AMP-194-00

TRADE NAME	Magnavox Chassis AMP-194-00
MANUFACTURER	Magnavox Co., 2131 Bueter Road, Fort Wayne 4, Indiana
TYPE SET	AC Operated 3 Tube Stereo Amplifier
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 35 Watts, .42 Amp. @117 Volts AC



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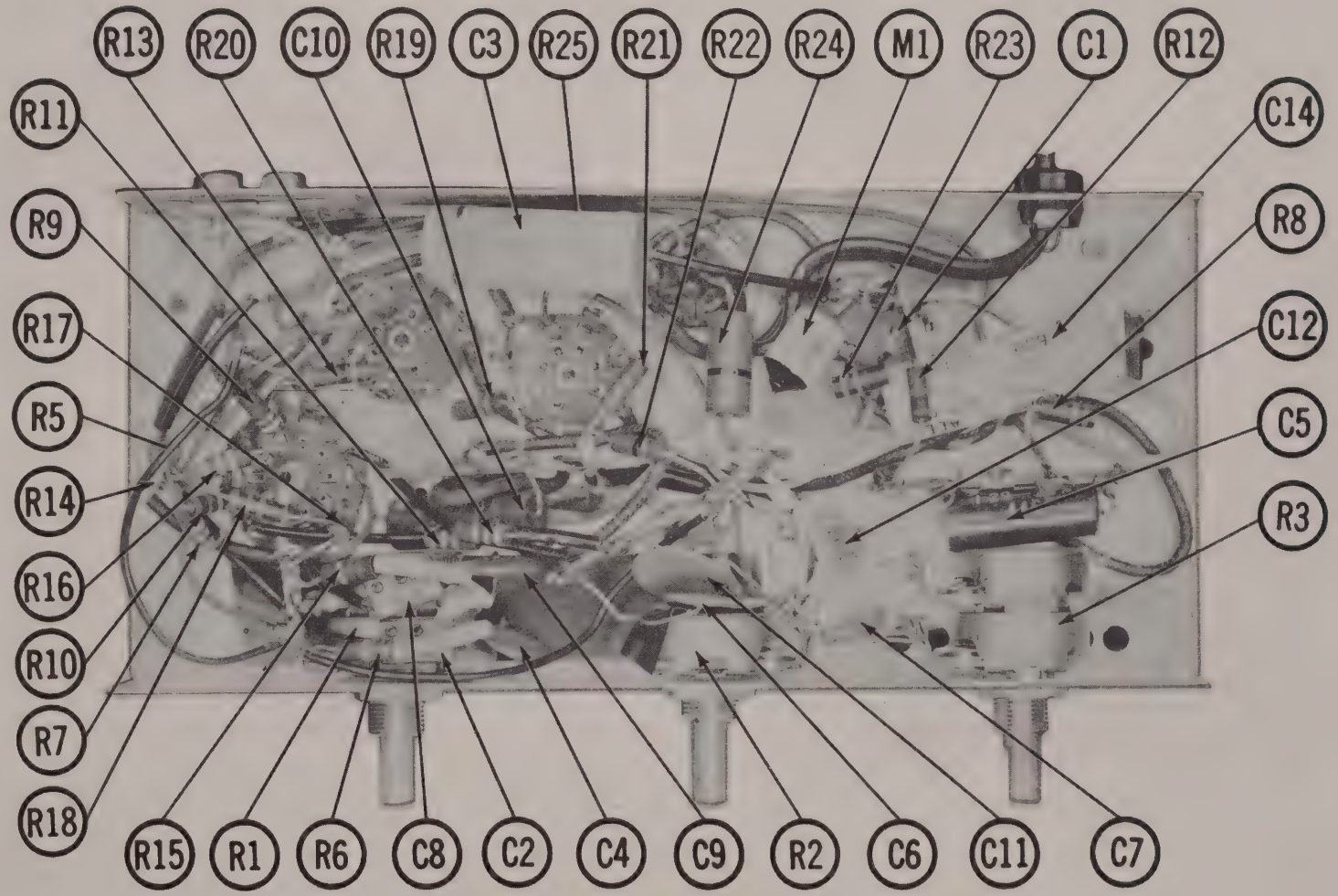
JV295

SET 460 FOLDER 12



CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆					
ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	Channel 1 AF Amp. - Channel 2 AF Amp.	7025	V2	Channel 1 Output	50EH5
			V3	Channel 2 Output	50EH5

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MAGNAVOX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■120	150	270023-31				TMD-15	TVLS-3447.5*	
B	▲40	150					TDLD-5		
C	20	150							

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	33			250187-66	1469-000033	DD-330	22R5Q33	CNO-433	MS-433	
C3	.047	600		250201-11	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C4	1000			250218-28	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C5	.047	100		250261-21	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C6	10000			250175-2	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C7	5000			250175-30	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C8	33			250187-66	1469-000033	DD-330	22R5Q33	CNO-433	MS-433	
C9	1000			250218-28	BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C10	.047	100		250261-21	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C11	10000			250175-2	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C12	5000			250175-30	BPD-005	DD-502	BYA10D5	B-250	5HK-D5	
C13	2.0						WMF1W2E	GTM-12		
C14	.047	600		250201-11	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MAGNAVOX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	3.3meg		220151-14					Loudness, Channel 1 *
B	3.3meg							Loudness, Channel 2 *
R2A	1meg		220072-33①	B-69	A47-1meg-S	Q11-137	U54	Balance
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R3A	1meg		220151-15	B-70	AD47-1meg-Z	Q11-137		Tone, Channel 1
B	1meg			SR-70	Not Req.	M13-137	† UE3913	Tone, Channel 2
C	Shaft			Not Req.	FS-3	Not Req.		

① Alternate Part #220072-41. † "STA-LOC" Equivalent: FA16A, RU16A, CS3500. * Tap ⓐ 1.6meg.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R4	1meg	
R5	820K	
R6	220K	
R7	470K	
R8	6800Ω	
R9	470Ω	
R10	68K	
R11	47K	

ITEM No.	RATING	REMARKS
R12	1500Ω	
R13	68Ω	
R14	820K	
R15	220K	
R16	470K	
R17	470Ω	
R18	68K	
R19	6800Ω	

ITEM No.	RATING	REMARKS
R20	47K	
R21	1500Ω	
R22	68Ω	
R23	6800Ω	
R24	22Ω 2W	
R25	33Ω 1W	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.1	MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	5200Ω tap ⓐ 3%	70Ω SEC. 2 3-4Ω	320288-2							
T2	5200Ω tap ⓐ 3%	SEC.1 70Ω SEC. 2 3-4Ω	320288-2							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MAGNAVOX PART No.	QUAM PART No.	
SP1	8"	PM	3-4Ω	584013	8A31	
SP2	5"	PM	3-4Ω	580058-1	5A15TZ3.8	

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	MAGNAVOX PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.107A	530058-1 ①	CA102DA①	SD-94 ①		K200 ①	① Silicon Type.

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA						REMARKS
	MAGNAVOX PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M2		13T	Not Req.			26S	Not Req.	

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

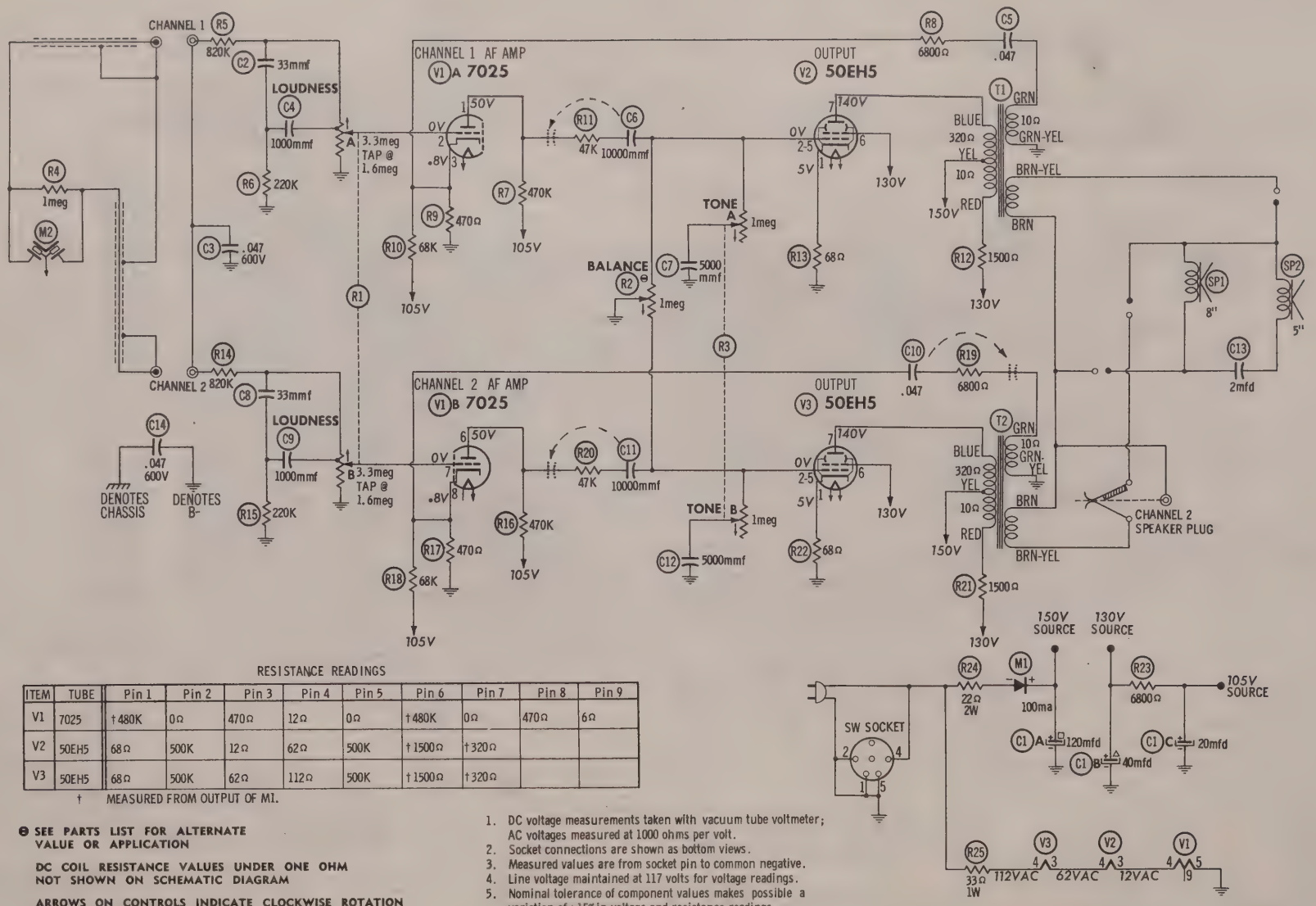
ITEM No.	REPLACEMENT DATA			REMARKS
	MAGNAVOX PART No.	JENSEN PART No.	WALCO PART No.	
M3	(Std)	E98† or E98D ♦	*W-101STS † or *W-101SDT ♦ or *W-102S †	* Includes Cartridge † Jewel ♦ Diamond
	(LP)	E98X † or E98XD ♦		

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	7025	†480K	0Ω	470Ω	12Ω	0Ω	†480K	0Ω	470Ω	6Ω
V2	50EH5	68Ω	500K	12Ω	62Ω	500K	†1500Ω	†320Ω		
V3	50EH5	68Ω	500K	62Ω	112Ω	500K	†1500Ω	†320Ω		

† MEASURED FROM OUTPUT OF M1.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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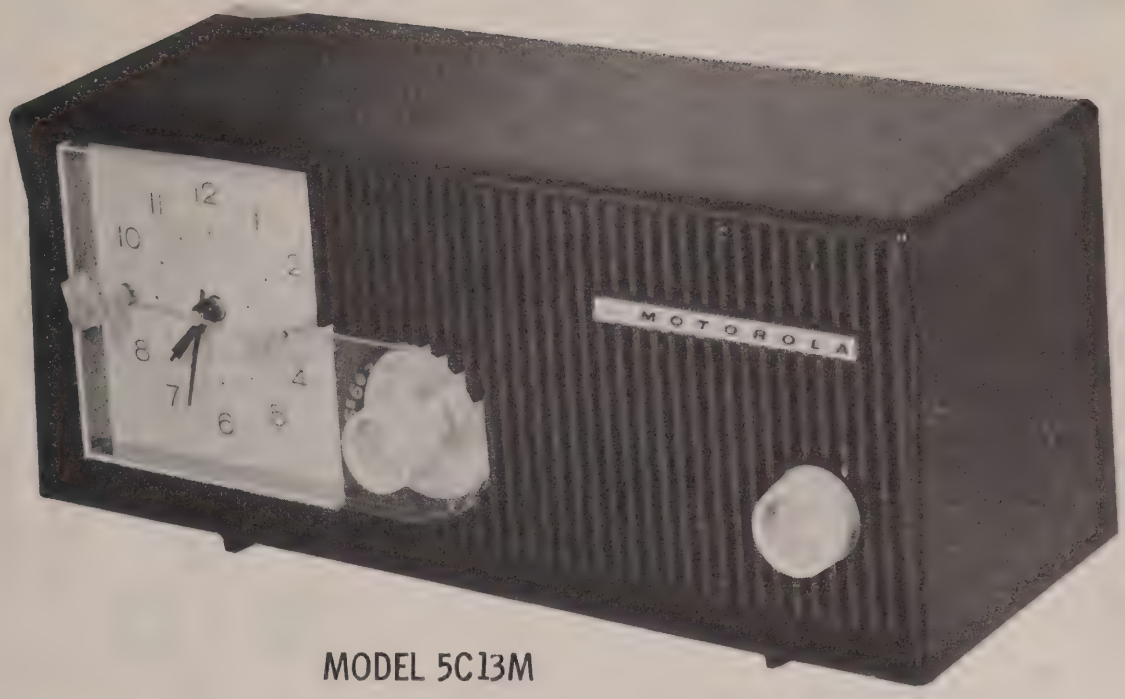
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

MAGNAVOX CHASSIS AMP-194-00

PHOTOFACT* Folder with CIRCUITRACE*

MOTOROLA MODELS 5C13B, M, P, W, 5C14CW, GW, PW, 5C16NW, W (Ch. HS-660, HS-661, HS-663)

MOTOROLA MODELS 5C13B, M, P, W, 5C14CW, GW, PW, 5C16NW, W (Ch. HS-660, HS-661, HS-663)



MODEL 5C13M

MOTOROLA MODELS 5C13B, M, P, W, 5C14CW, GW, PW, 5C16NW, W (Ch. HS-660, HS-661, HS-663)

TRADE NAME	Motorola Models 5C13B, M, P, W (Ch. HS-660), 5C14CW, GW, PW (Ch. HS-661), 5C16NW, W (Ch. HS-663)
MANUFACTURER	Motorola, Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois
TYPE SET	AC Operated 5 Tube AM Receiver with Electric Clock
POWER SUPPLY	110-120 Volts AC, 60 Cycles — RATING 29 Watts, .28 Amp. @ 117 Volts AC (Less Clock)
TUNING RANGE—BROADCAST	532-1620KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1, A2, A3, A4 ... GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545
A5, A7 ..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

(Omit Step 3 for Ch. HS-661, HS-663. Omit Step 4 for Ch. HS-660)

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400∿ Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1620KC	"	"	A5	"
3.		Loop	600KC	600KC	"	A6	Re-install receiver in cabinet. Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	1400KC	1400KC	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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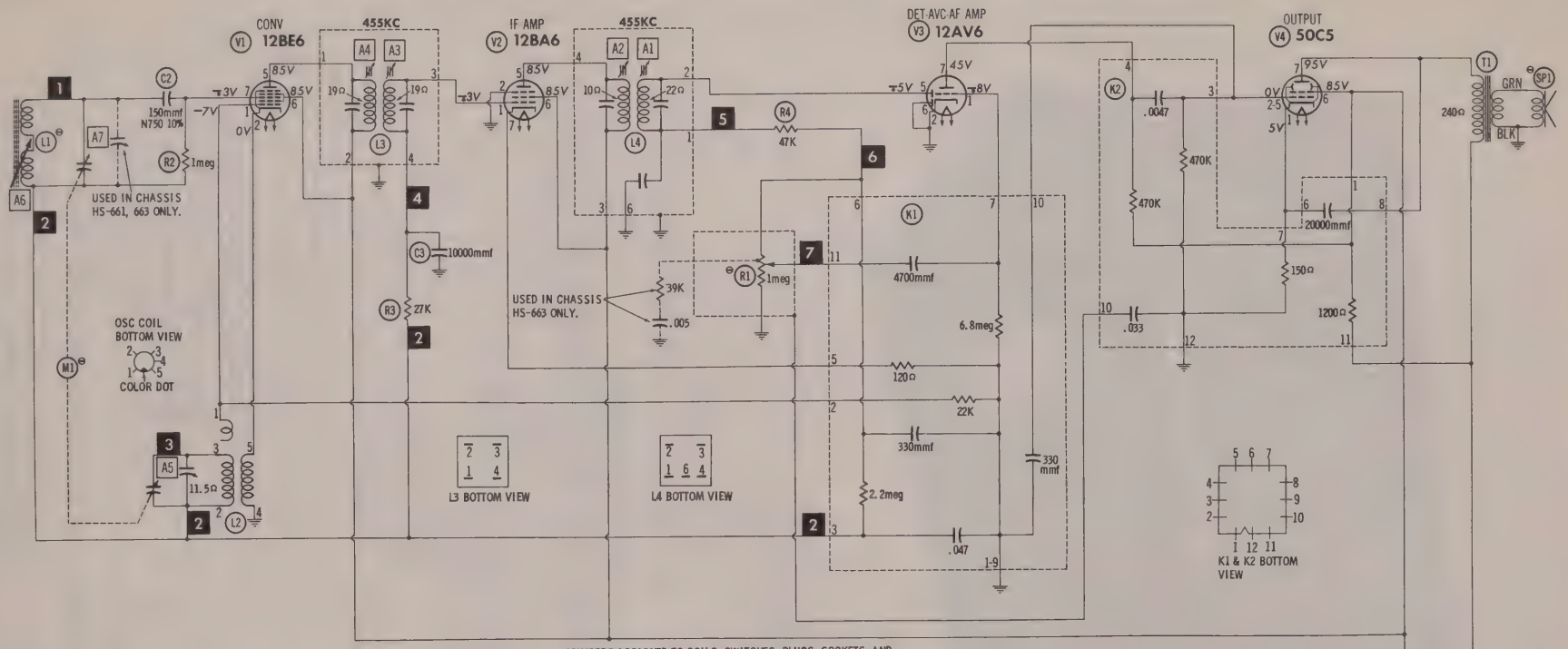
JG218

SET 460 FOLDER 13



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	1Ω	22Ω	10Ω	†1300Ω	†1300Ω	3.2meg
V2	12BA6	3.2meg	0Ω	22Ω	32Ω	†1300Ω	†1300Ω	120Ω
V3	12AV6	6.8meg	0Ω	0Ω	10Ω	1meg	0Ω	†470K
V4	50C5	150Ω	470K	32Ω	80Ω	470K	†1300Ω	†340Ω
V5	35W4	TP	TP	80Ω	110Ω	110Ω	100Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V5.
TP TIE POINT.

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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MOTOROLA MODELS 5C13B, M, P, W, 5C14CW, GW, PW, 5C16NW, W (Ch. HS-660, HS-661, HS-663)

PARTS LIST AND DESCRIPTIONS

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆

ITEM No.	USE	TYPE
V1	Converter	12BE6
V2	IF Amplifier	12BA6
V3	Det.-AVC-AF Amp.	12AV6
V4	Output	50C5
V5	Rectifier	35W4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■40	150	23B639496	AFH3-11-30	C0090 ‡	PFP311.63		PCLS-3439.1*	
B	▲40	150							
C	30	150							

‡ Use printed circuit adapters #55277 and 55278.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	150		N750 10%	21K127652	N750-DI 150	DTN-150	C10T15U	CN7-315	5TCU-T15S 10% *	
C3	10000			21B533471	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C4	.05	400		8K128690	P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	1meg	½	18K638017					Volume, Note 1

Note 1. Used in Ch. HS-660. Ch. HS-661 uses 1meg (Part #18B637860).
Ch. HS-663 uses 1meg with 300K tap (Part #18K640716).

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	1meg	
R3	27K	
R4	47K	
R5	100Ω	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	MOTOROLA PART No.	REPLACEMENT DATA
K1	Detector-AVC-Audio Coupling	330mmf, 330mmf, 4700mmf, .047mfd, 120Ω, 22K, 2.2meg, 6.8meg	51C637000	
K2	Audio Coupling	20000mmf, .033mfd, .0047mfd, 150Ω, 1200Ω, 470K, 470K	51K637001	

PRINTED BOARD

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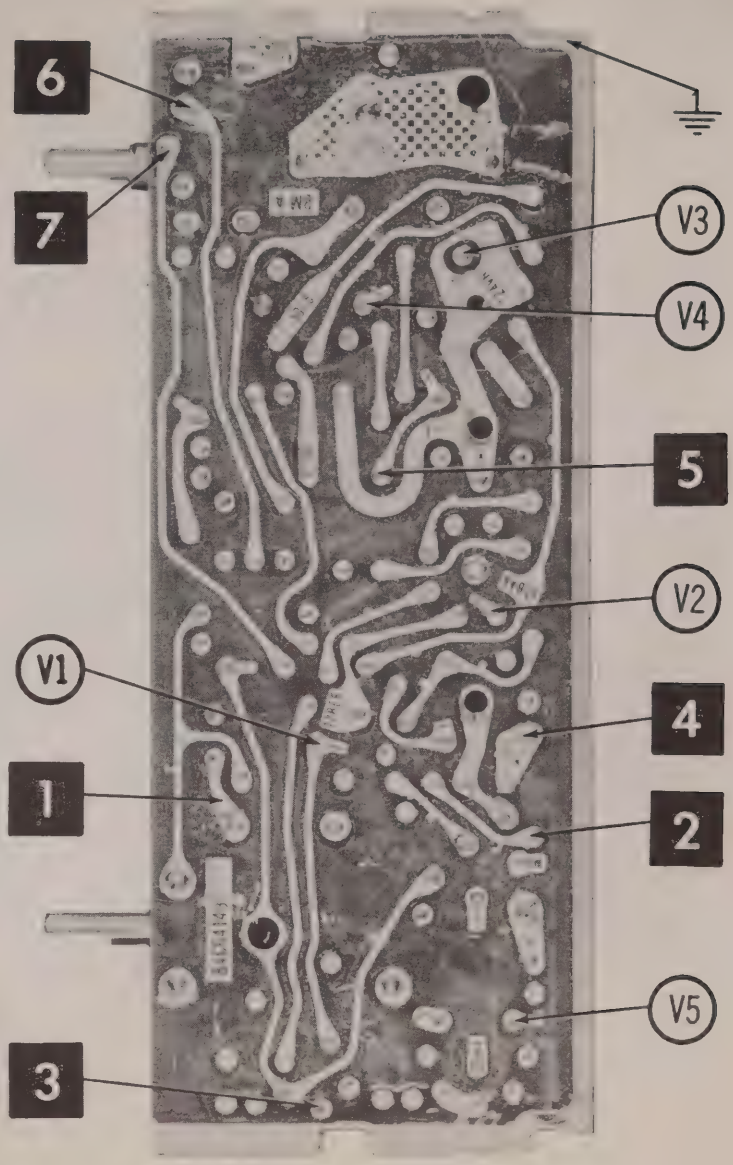
ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



MOTOROLA MODELS 5C13B, M, P, W, 5C14CW, GW, PW, 5C16NW, W (Ch. HS-660, HS-661, HS-663)

FOLDER 13

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		MOTOROLA PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	24K640992 †						
L2	Osc. Coil	24B637228						
L3	Input IF	24K636016	16-6780	16-6780	BC-356	13-PC9	RF-4	
L4	Output IF	24K639362						

† Ch. HS-661 and HS-663 use Part #24K636190 in this application.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	3100Ω	3-4Ω	25B640767	24S53 ①	A-3025 ①	AU-605 ①	A-3332 ①	24S53 ①	S-12X ①	① Use original channel frame.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	50K638023 ①	4A07	① Used in Models 5C13 Series
	4"	PM	3-4Ω	50C637838 ②		② Used in Models 5C14 Series
	4"	PM	3-4Ω	50K640832 ③		③ Used in Models 5C16 Series

MISCELLANEOUS

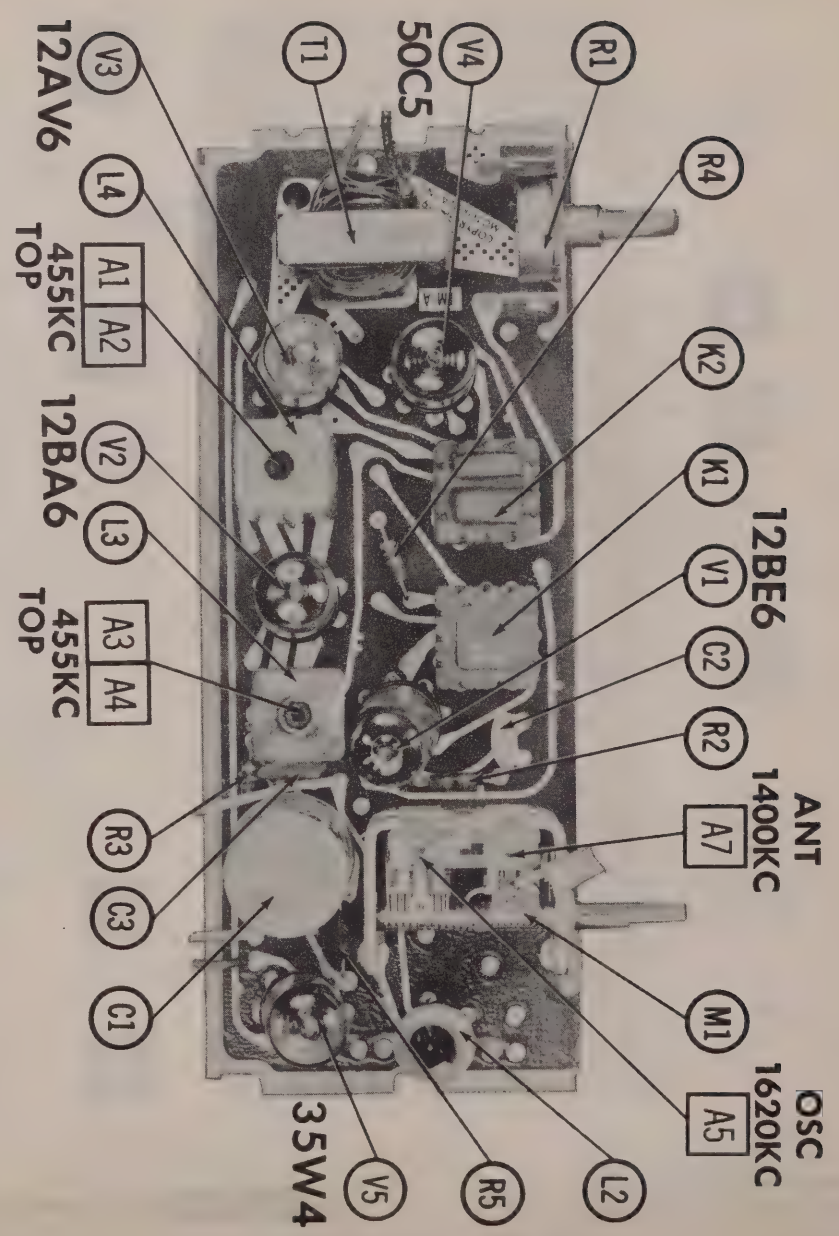
ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M1	Tuning Cap.	19K640821	2 Gang, Ch. HS-660
	Tuning Cap.	19B640820	2 Gang, Ch. HS-661
	Tuning Cap.	19B640770	2 Gang, Ch. HS-663
M2	Clock Assembly	72D638025	Model 5C13M
	Clock Assembly	72K640805	Models 5C13B, 5C13P, 5C13W
	Clock Assembly	72K640839	Models 5C14CW, 5C14GW, 5C14PW
	Clock Assembly	72D640857	Models 5C16NW, 5C16W
	Printed Board	84C641490	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	36B641068	Dial scale, Models 5C16NW, 5C16W
Knob	36K640808	Tuning, Models 5C13M, 5C13P, 5C13W
Knob	36K640854	Tuning, Models 5C14CW, 5C14GW, 5C14PW
Knob	36K640963	Tuning, Models 5C16NW, 5C16W
Knob	36K640809	Volume, Models 5C13M, 5C13P, 5C13W
Knob	36K640856	Volume, Models 5C14CW, 5C14GW, 5C14PW
Knob	36C637898	Volume, Models 5C16NW, 5C16W
Knob	36C635812	Clock, Models 5C13M, 5C13P, 5C13W
Knob	36B637835	Clock, Models 5C14CW, 5C14GW, 5C14PW
Pushbutton	38K641367	Clock, Models 5C16NW, 5C16W
Cabinet	1V640896	Blue, Model 5C13B
Cabinet	1V642969	Mahogany, Model 5C13M
Cabinet	1V640895	Pink, Model 5C13P
Cabinet	1V640897	Antique White, Model 5C13W
Cabinet Back	24K640992	Includes Antenna, Models 5C13M, 5C13P, 5C13W
Cabinet Front	1V640935	Blue, Model 5C14CW
Cabinet Front	1V640936	Green, Model 5C14GW
Cabinet Front	1V640937	Pink, Model 5C14PW
Cabinet Front	1V641150	Mocha, Model 5C14NW
Cabinet Front	1V641151	Antique White, Model 5C16W
Cabinet Rear	1V640938	Antique White, Model 5C14CW, 5C14GW, 5C14PW
Cabinet Rear	1V641152	Antique White, Models 5C16NW, 5C16W
Clock Crystal	61K640807	Models 5C13M, 5C13P, 5C13W
Clock Crystal	61B637834	Models 5C14CW, 5C14GW, 5C14PW
Clock Crystal	61B640819	Models 5C16NW, 5C16W

CHASSIS—TOP VIEW

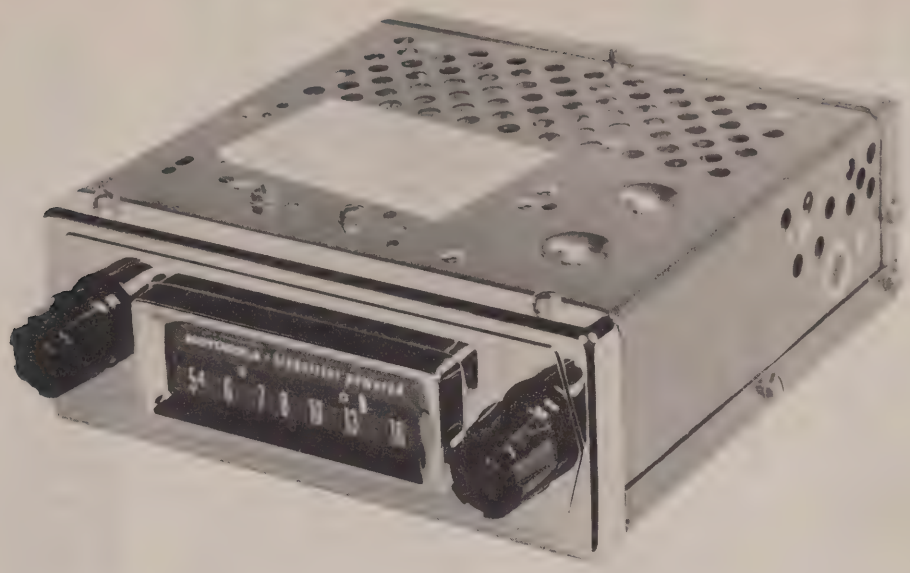


PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

MOTOROLA
MODEL 406

MOTOROLA
MODEL 406



TRADE NAME	Motorola Model 406
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois
TYPE SET	Battery Operated 4 Tube Universal Type AM Automobile Receiver with Transistorized Output
POWER SUPPLY	6 Volt Storage Battery — RATING 2.5 Amp. @ 6.3 Volts DC
TUNING RANGE—BROADCAST	540-1610KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:

A1, A2, A3, A4 .... GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

A5, A6, A7 ..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

A8, A9, A10 GENERAL CEMENT #9050L, 9150
WALSCO #2521

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to antenna receptacle. Low side to chassis.	262.5KC (400∿ Mod)	High Freq. end stop	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	Fig. 1	Thru dummy to antenna receptacle.	1610KC	"	"	A5, A6, A7	"
	Step 3 is not necessary unless the tuning coils have been tampered with or replaced. Back the tuning cores (A8, A9, and A10) out of coils but not out of coil forms. Repeat step 2.						
3.	Fig. 1	Thru dummy to antenna receptacle.	1200KC	Tuner carriage 9/32" from high end stop.	Across voice coil	A8, A9, A10	Adjust for maximum output. Repeat steps 2 and 3 until no further increase is noted. Make step 3 the last step.
	With radio installed in car and antenna fully extended, tune in a weak station near 1400KC and adjust A7 for maximum output.						

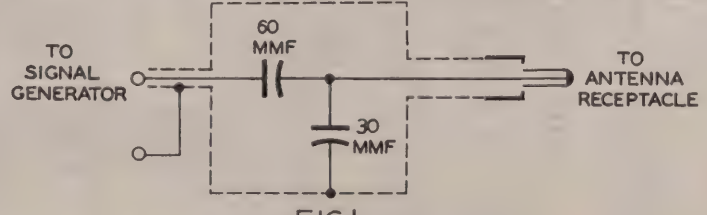


FIG.1

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

JD246

SET 460 FOLDER 14

PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆

ITEM No.	USE	TYPE
V1	Converter	6BE6
V2	IF Amp.	6BA6
V3	Det.-AVC-AF Amp.	6CR6
V4	Driver	6BF6

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	MN73 *	Power Osc.	2N155	2N176		2N176	PNP Note 1
X2	MN73 *	Output	2N155	2N176		2N176	PNP Note 1

* Some versions may use 2N176 in this application.
Note 1. When replacing, apply DC-4 grease (Part #11M490487) or equivalent to both side of insulator. Tighten mounting screws securely.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	■1000	8	23B543393	AFH2-77-05		WP039		TVLS-2406 *	
B	▲50	150				TC49			
C2	50	150	23B543394	PRS150V50	BR5015	TC49	TD-50-150	TVA-1414	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	40-430			20K542456						
C4	.002	1000		8R122291	P1088N-002	DD-202	CUB10D2	GEM-1022	10TM-D2	
C5	20-120			20K541014						
C6	27		NPO 10%	21R410089			C10Q27C	CNO-427	5TCC-Q27S 10%*	
C7	50000			21A542384	BPD-05	DF-503	BYB6S5	TA-150	5HK-S5	
C8	47		N750	21R115593	N750-DI 47		C10Q47U	CN7-447	5TCU-Q47	
C9	395-470			20A485708						
C10	10000			21R482726	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C11	.05	200		8R121005	P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C12	.01	200		8R121868	P288N-01	DD-103	CUB4S1	GEM-411	4TM-S1	
C13	330			21R410118	BPD-00033	DD-331	L10T33	B-333	5GA-T33	
C14	50000			21A542384	BPD-05	DF-503	BYB6S5	TA-150	5HK-S5	
C15	.5	100		8K122076	P288N-5		CUB2P5	GEM-205	2TM-P5	
C16	.5	100		8K122076	P288N-5		CUB2P5	GEM-205	2TM-P5	
C17	.5	100		8K122076	P288N-5		CUB2P5	GEM-205	2TM-P5	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1meg	½	18K543389					Volume, Note 1
B	Switch							Off-On
R2	125Ω	1(WW)	18A542810					Bias

Note 1. Some versions may use Part #18K543802.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R3	1meg	
R4	47K	
R5	220Ω	
R6	27K	
R7	3.9meg	
R8	3.9meg	

ITEM No.	RATING	REMARKS
R9	220K	
R10	1.5meg	
R11	1meg	
R12	1meg	
R13	10meg	
R14	10Ω COLD	#6K540634

ITEM No.	RATING	REMARKS
R15	5.6Ω 1W	#6A488139
R16	1000Ω	
R17		#6A543419 ①
R18	2700Ω	
R19	56Ω	
R20	.47Ω	#17K488266

① Temperature Compensating. To check remove tubes, and connect a milliammeter in series with R17. Normal operation will give a reading of 8 to 15MA.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		MOTOROLA PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Ant. Coil	24K562246 †						† Part of M3.
L2	RF Coil	24K562245 †						
L3	Osc. Coil	24K562244 †						
L4	Input IF	24B543286	16-6752	16-6752	BC-350	12-H2	RF-3	
L5	Output IF	24K542749	16-6754	16-6754	BC-354	12-H6		

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ∿)	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L6	.720A	.4Ω	.002 Hy.	25B543396				TC-1		

TRANSFORMER (POWER OSC.)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1		57V ⓐ .020A		25C543395						

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	22	1	25B543386						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T3	8Ω	3-4Ω	25C543416							

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	
SP1	5"	PM	3-4Ω	50C543476	5A15	

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	MOTOROLA PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.011A	48K543405 ①	1234AH ① HA154 ②	T065 ① SD-94 ③		65A ① K200 ②	① Selenium Type. ② Silicon Type.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			MOTOROLA PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	SFE	9A 32V	65R16248	1V541705	307009. (SFE 9A 32V)	155009	SFE 9	HDH

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M3	Tuner	77D562242	MT-262, Complete
	Tuner	77K563073	MT-300, Complete
M4	Spark Plate	64K530177	1" x 2"
M5A	Spark Plate	21A522033	3000mmf
B	Spark Plate		3000mmf

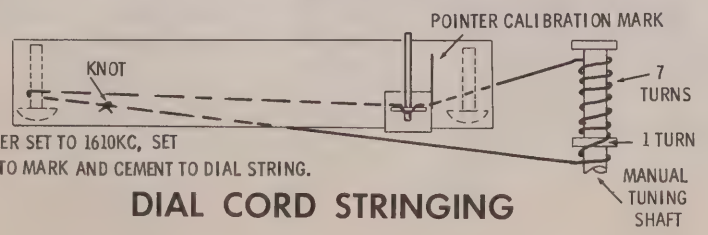
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	36B543382	Tuning, Volume Off-On
Bottom Cover	15C543237	
Pointer	1K543277	
Dial Scale	34B543390	

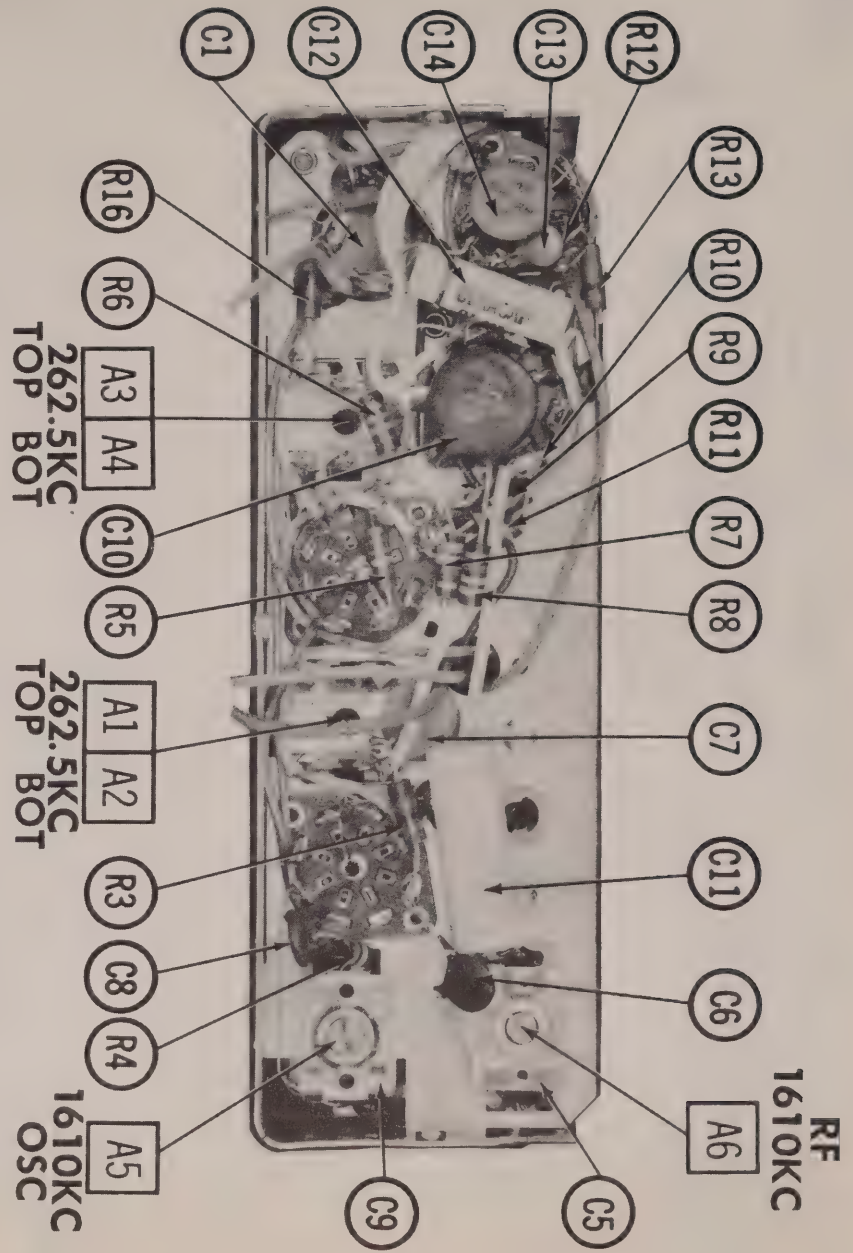
WIRING DATA

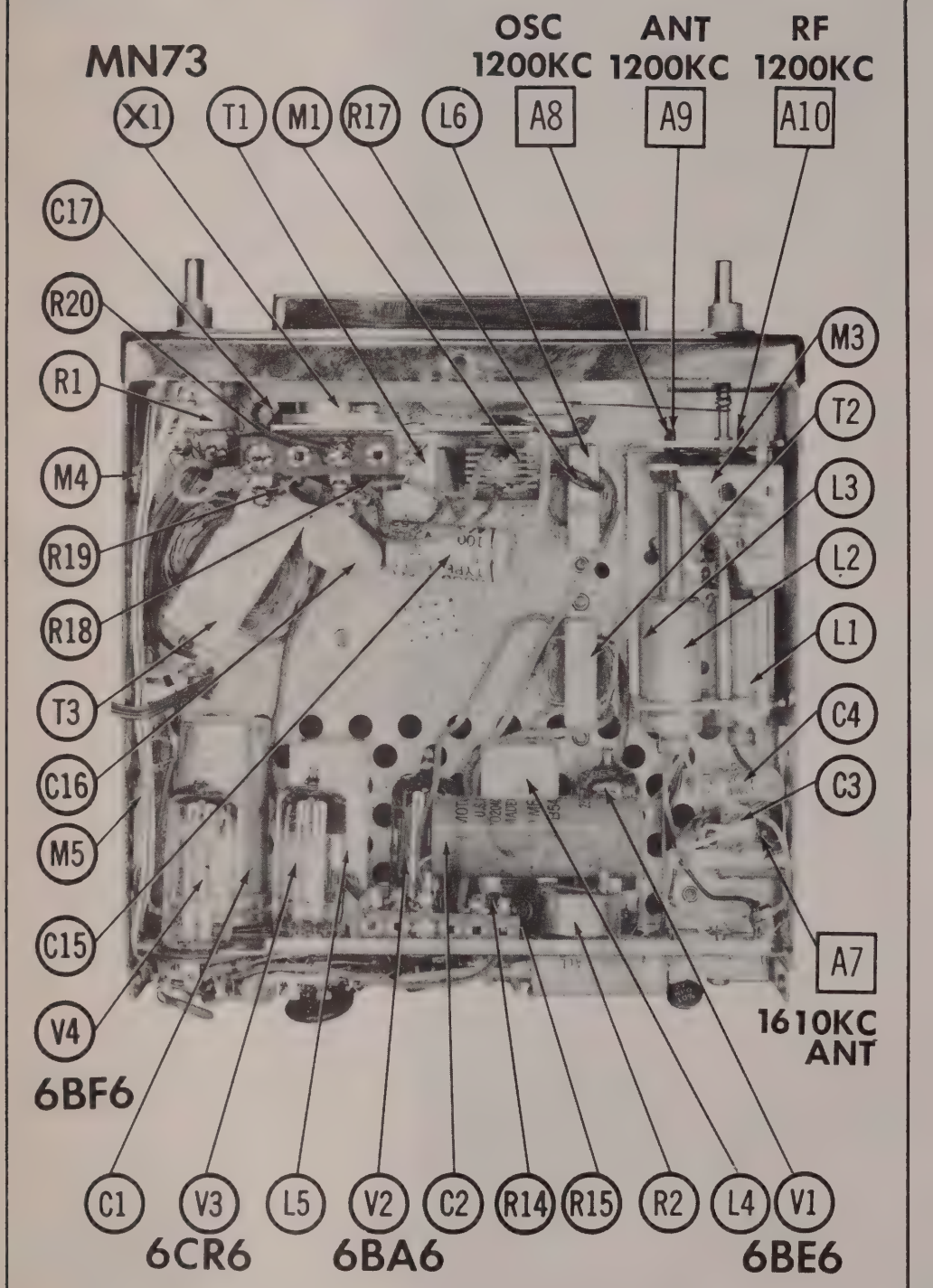
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Shielded Hook-up Wire	Use BELDEN No. 8885
Bonding Strap	Use BELDEN No. 8661



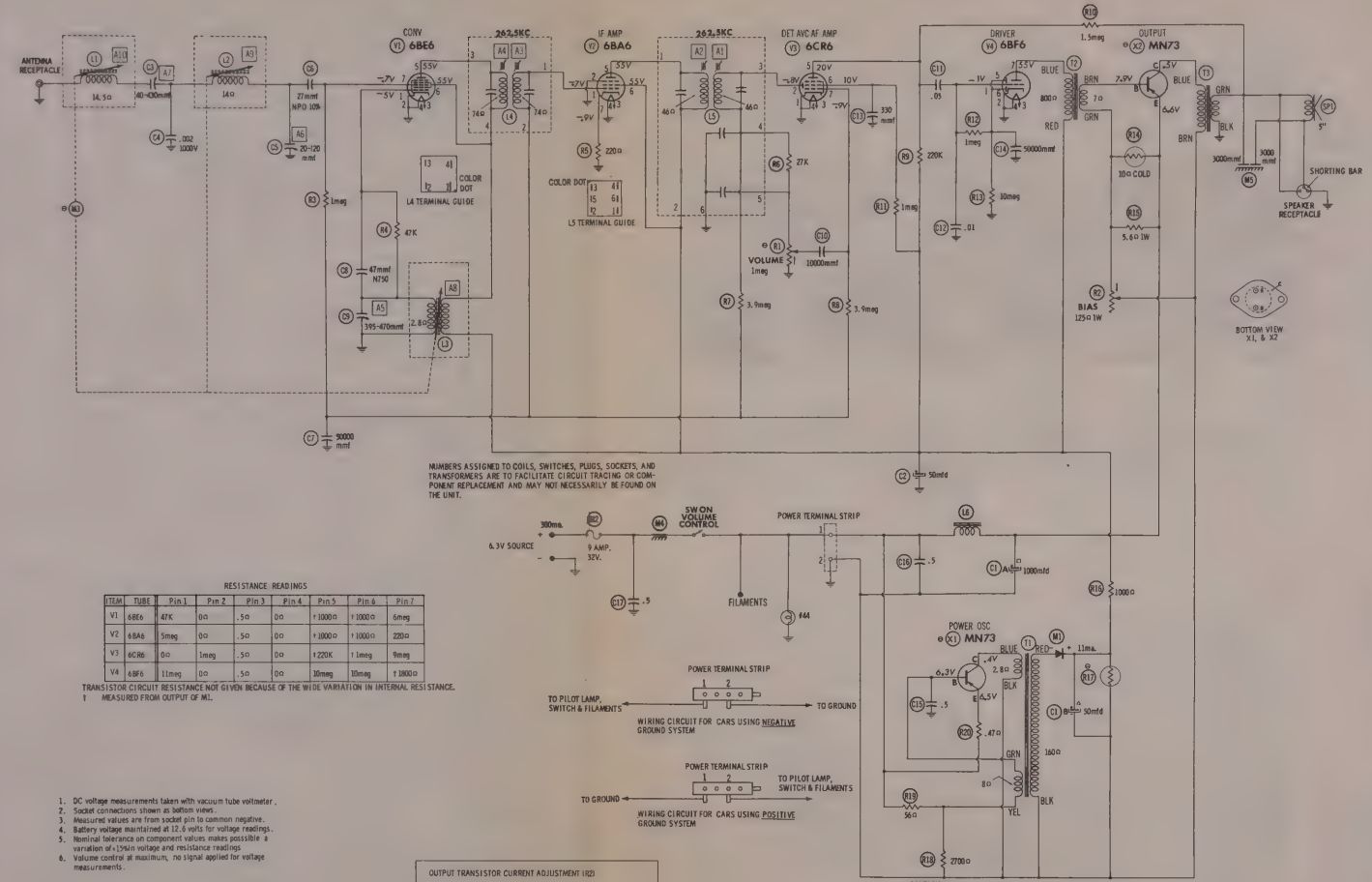
DIAL CORD STRINGING

CHASSIS—END VIEW





CHASSIS TOP VIEW



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	6BE6	47K	0Ω	.5Ω	0Ω	†1000Ω	†1000Ω	6meg
V2	6BA6	5meg	0Ω	.5Ω	0Ω	†1000Ω	†1000Ω	220Ω
V3	6CR6	0Ω	1meg	.5Ω	0Ω	†220K	†1meg	9meg
V4	6BF6	11meg	0Ω	.5Ω	0Ω	10meg	10meg	†1800Ω

TRANSISTOR CIRCUIT RESISTANCE NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL RESISTANCE.
† MEASURED FROM OUTPUT OF M1.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±5% in voltage and resistance readings
6. Volume control at maximum, no signal applied for voltage measurements.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

OUTPUT TRANSISTOR CURRENT ADJUSTMENT (R2)

Connect a 0-3 Amp. DC meter in series with the "A" lead. Remove the Output Transistor from its socket. Turn the radio on and set the source voltage at 6.3VDC. Note the meter reading. Replace the transistor in its socket and recheck the applied voltage for 6.3 volts. Adjust R2 for a current reading of 600MA higher than previously obtained. If a power source of 7VDC is used, R2 should be adjusted for 720MA higher than first noted.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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MOTOROLA MODEL 406

PHOTOFACT* Folder with CIRCUITRACE*

OLYMPIC MODEL 770

OLYMPIC MODEL 770

OLYMPIC MODEL 770

TRADE NAME	Olympic Model 770
MANUFACTURER	Olympic Radio & TV Inc.; 34-01 38th St., Long Island City 1, N.Y.
TYPE SET	Battery Operated Portable Transistorized AM Receiver
POWER SUPPLY	9 Volts DC
TUNING RANGE—BROADCAST	530-1650KC
RATING	5.7MA @ 9 Volts DC (No Signal, Min. Volume) 6.5MA @ 9 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

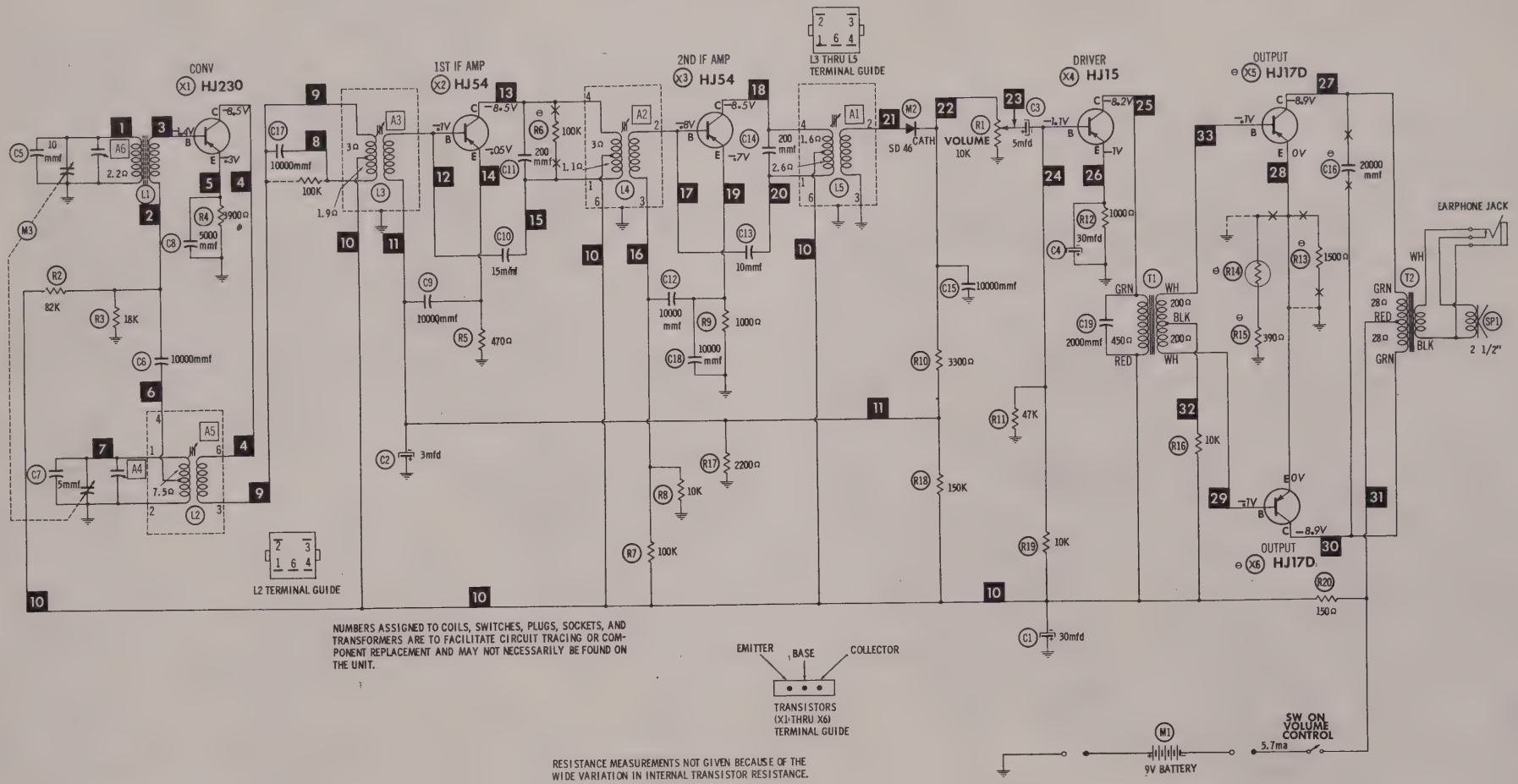
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400~ Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1650KC	"	"	A4	"
3.		"	600KC	600KC	"	A5	"
4.		"	1400KC	1400KC	"	A6	"

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

JF232

SET 460 FOLDER 15



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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OLYMPIC MODEL 770

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	HJ230	Converter			2N486		PNP
X2	HJ54	1st IF Amplifier			2N483		PNP
X3	HJ54	2nd IF Amplifier			2N483		PNP
X4	HJ15	Driver			2N362		PNP
X5	HJ17D	Output			2N632		PNP (Matched Pair
X6	HJ17D	Output			2N632		PNP)

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	OLYMPIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	30	12	COJ30032	XPP-12030	NLW30-15	TT15X30	ML30-15	TE-1158	
C2	3	6		XPP-6003	NLW3-6	TT6X3	ML4-6	TE-1082	
C3	5	3			NLW5-6	TT6X5	ML5-6	TE-1052.3	
C4	30	6		PWE6030	NLW30-6	TT6X30	ML30-6	TE-1092	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	10				BPD-00001	DD-100	L10Q1	CNO-410	5GA-Q10	
C6	10000				C-80V103AM	DM-103	H-05S1	TA-110	TG-S10	
C7	5				DI-5	DD-050	L10V5	ZT-555	5GA-V5	
C8	5000				C-80V502AM	DDA-502	H-05D5	TA-250	TG-D5	
C9	10000				C-80V103AM	DM-103	H-05S1	TA-110	TG-S10	
C10	15				DI-15	DD-150	L10Q15	CNO-415	5GA-Q15	
C11	200				SI 200	DD-201	L10T2	UC-532	5GA-T2	
C12	10000				C-80V103AM	DM-103	H-05S1	TA-110	TG-S10	
C13	10				DI-10	DD-100	L10Q1	CNO-410	5GA-Q1	
C14	200				DI-200	DD-201	L10T2	UC-532	5GA-T2	
C15	10000				C-80V103AM	DM-103	H-05S1	TA-110	TG-S10	
C16	20000				C-80V203AM	DDM-203	H-05S2	TA-120	TG-S20	①
C17	10000				C-80V103AM	DM-103	H-05S1	TA-110	TG-S10	
C18	10000				C-80V103AM	DM-103	H-05S1	TA-110	TG-S10	
C19	2000				BPD-002	DM-202	L10D2	B-220	5GA-D2	

① Not used in some versions.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	OLYMPIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	10K	1/4	PTJ30060	B16-216				Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	82K	
R3	18K	
R4	3900Ω	
R5	470Ω	
R6	100K	Note 1
R7	100K	
R8	10K	

ITEM No.	RATING	REMARKS
R9	1000Ω	
R10	3300Ω	
R11	47K	
R12	1000Ω	
R13	1500Ω	Note 1 Temp. Comp.
R14		
R15	390Ω	

ITEM No.	RATING	REMARKS
R16	10K	
R17	2200Ω	
R18	150K	
R19	10K	
R20	150Ω	

Note 1. Not used in some versions.

PRINTED BOARD

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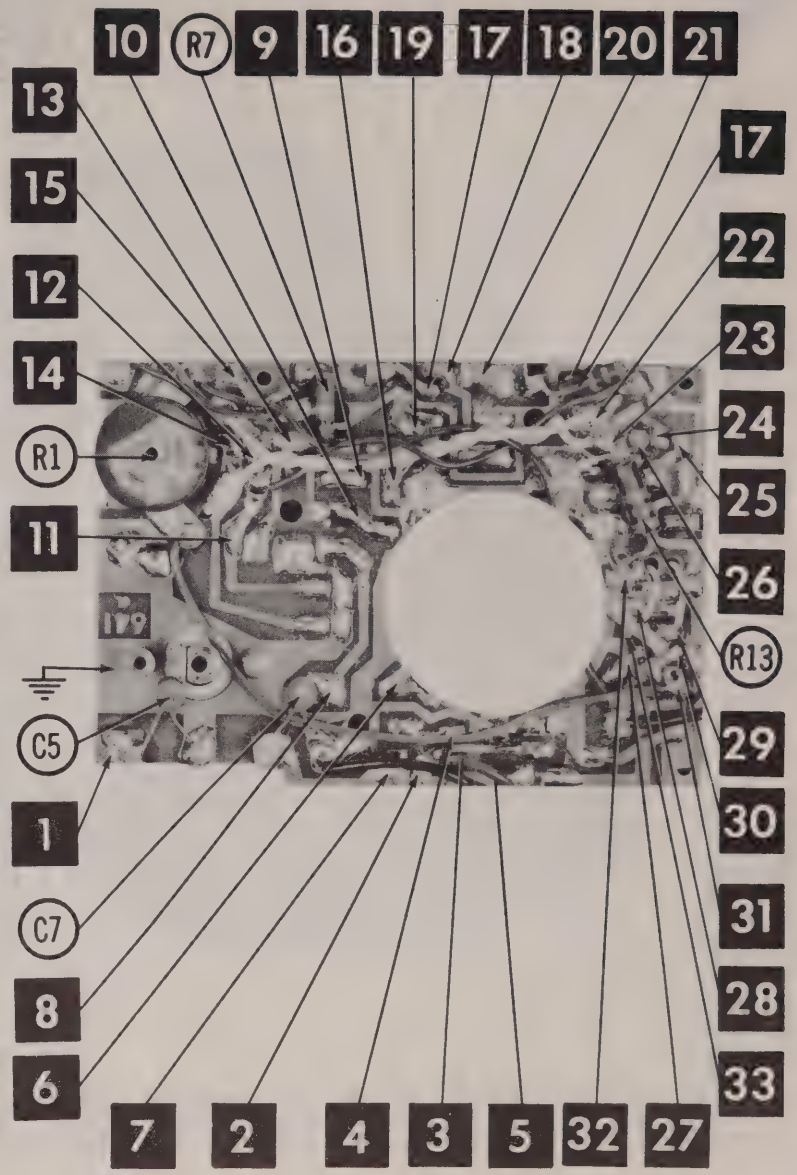


PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		OLYMPIC PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	LPJ30058						
L2	Osc. Coil	CLJ25133						
L3	1st IF Trans.	TRJ25137						
L4	2nd IF Trans.	TRJ25138						
L5	3rd IF Trans.	TRJ25139						

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1	1	TRJ30057						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	420Ω CT	10Ω	TRJ30056	TR-19			TA-37	TR-19		

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	OLYMPIC PART No.	QUAM PART No.	
SP1	2½"	PM	10Ω	SKJ25229		

BATTERIES

ITEM No.	VOLTAGE	OLYMPIC PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V			2U6		216		TR-146R	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		OLYMPIC PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	SD46		1N60	1N60	1N295	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	OLYMPIC PART No.	NOTES
M3	Tuning Cap.	CVJ30063	2 Gang

CABINETS & CABINET PARTS

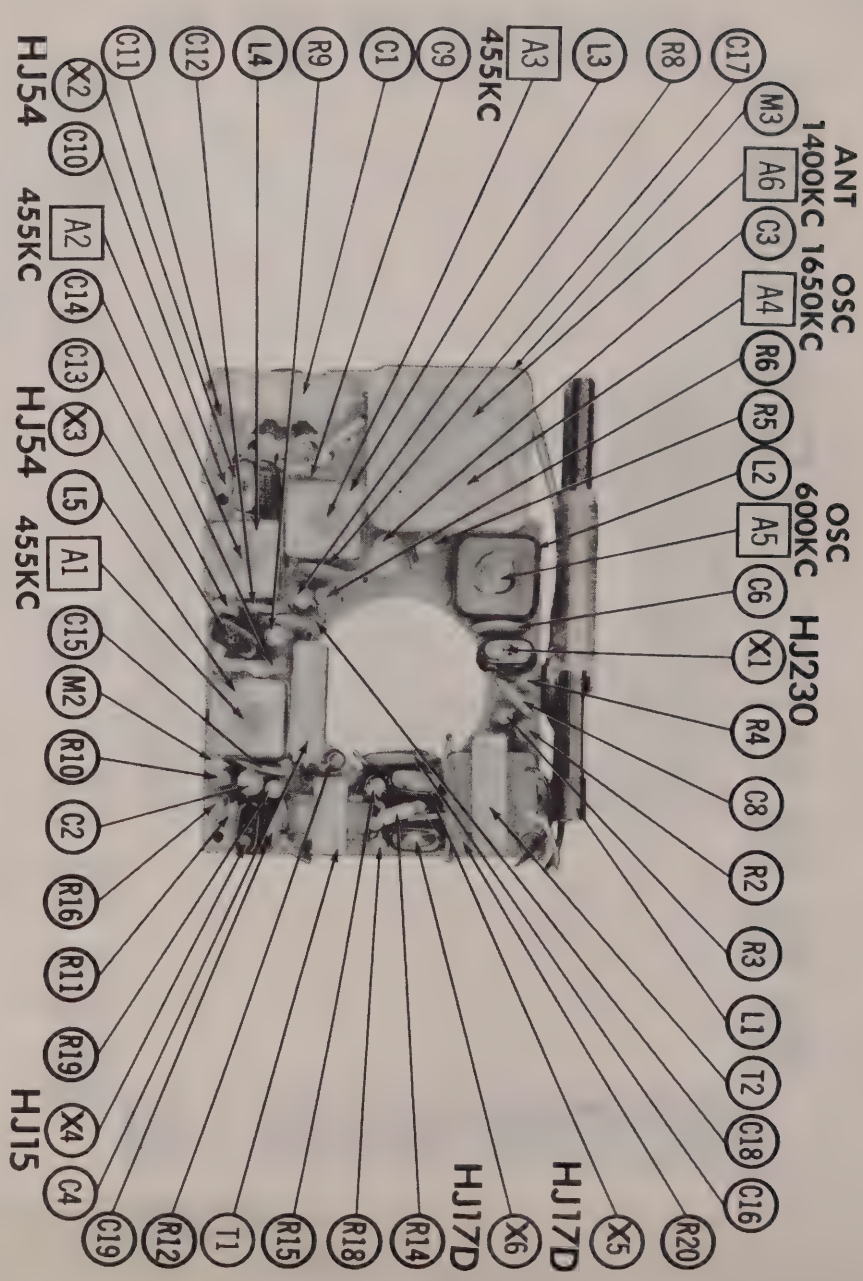
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	KNJ30055	Tuning
Knob	KNJ30059	Volume Off-On
Cabinet Front	CAJ-30061	Includes decorations and accessories
Cabinet Back	CAJ-30062	

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW



PHOTOFACT* Folder

PHILCO MODELS G-1606L, M, G-1606SL-123, G-1606SM-123, SA-1000

PHILCO MODELS G-1606L, M, G-1606SL-123, G-1606SM-123, SA-1000

MODEL G-1606M

PHILCO MODELS G-1606L, M, G-1606SL-123, G-1606SM-123, SA-1000

TRADE NAME	Philco Models G-1606L, G-1606M, G-1606SL-123, G-1606SM-123, SA-1000
MANUFACTURER	Philco Corp., Tioga & C Streets, Philadelphia, Pa.
TYPE SET	AC Operated 4 Tube Phono Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	105-120 Volts AC, 60 Cycles RATING 36 Watts, .38 Amp. @117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER M-41 — SEE SIMILAR V-M 954 — PHOTOFACT SET 396 FOLDER 13

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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JS289

SET 460 FOLDER 16

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	AF Amplifier	6AU6	V3	Output	6AQ5
V2	Output	6AQ5	V4	Rectifier	6X4

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	20	350	30-2575-47	PR4-175	BBRQ0125	TCT3764	CDBQ-1003	TVAS-3628 *	
B	30	350							
C	10	350							
C2	10	25	30-2417-49	SRE25V10	NLW10-25	TC22	ML10-25	TVA-1204	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	120		10%		1469-00012	D6-121	22R5T12	CNO-312	MS-312	①
C4	.0047	400		30-4650-56	P488N-0047	D6-472	CUB6D47	GEM-6247	6TM-D47	
C5	.1	400		30-4650-47	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C6	.0033	400		30-4650-55	P488N-0033	D6-332	CUB6D33	GEM-6233	6TM-D33	
C7	.047	600		30-4650-62	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C8	.1	400		30-4650-47	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C9	.0033	400		30-4650-55	P488N-0033	D6-332	CUB6D33	GEM-6233	6TM-D33	
C10	.001	600		30-4650-52	P688N-001	D6-102	CUB6D1	GEM-621	6TM-D1	

① Some versions may use 220mmf 10% in this application (Part #30-1225-11).

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA PHILCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2meg	1/2	33-5535-46	BT-82	A47F3-2meg	Q18-139X	UT-451	Volume, Tap@1meg
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R2	1meg	1/2	33-5587-23	B-68		Q17-137	U52	Treble, Note 1
R3A	1meg	1/2	33-5587-21	B-70	A47-1meg-Z	Q13-137	U53	Bass, Note 2
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

Note 1. Some versions may use 500K Treble (Part #33-5587-31).
Note 2. Model SA-1000 uses 1meg Bass (Part #33-5588-12).

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R4	47K	
R5	100Ω	
R6	2700Ω	
R7	22K	
R8	100K	
R9	270K	

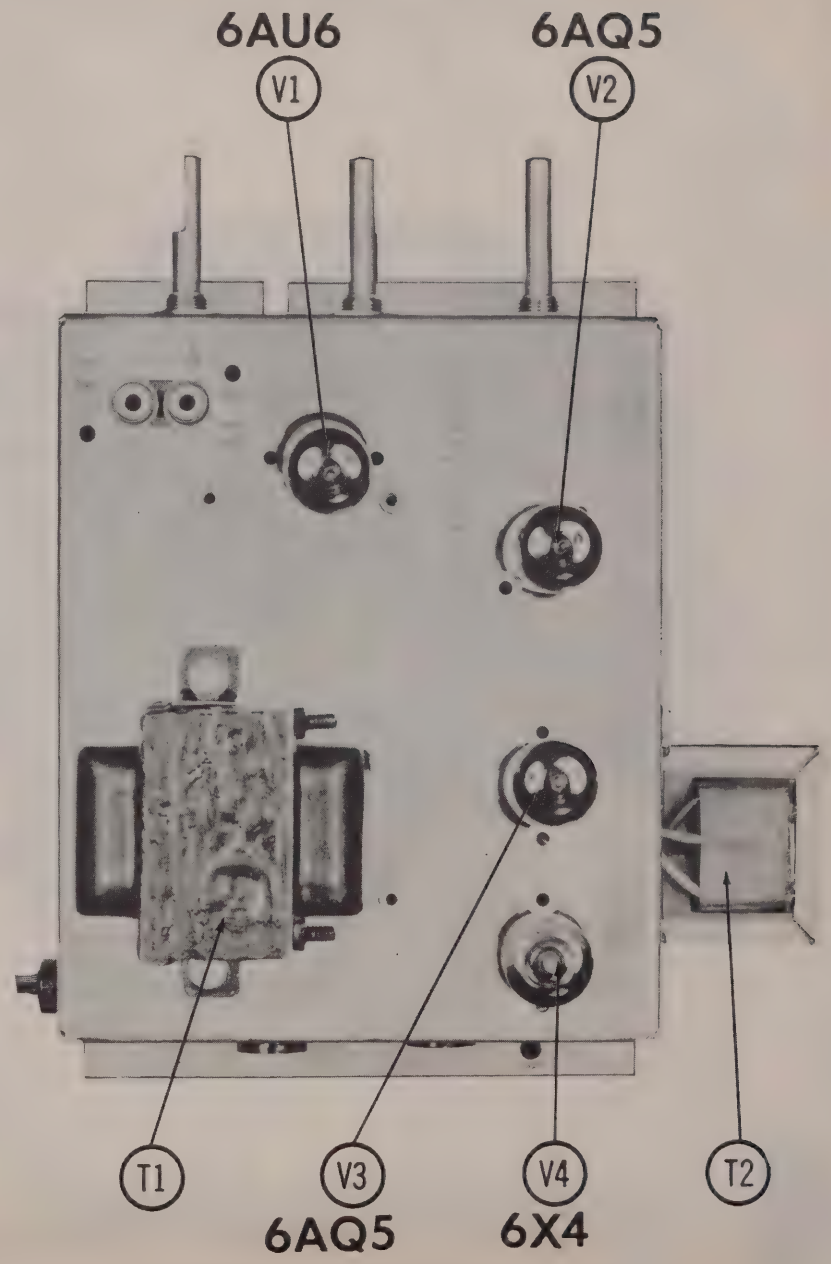
ITEM No.	RATING	REMARKS
R10	2700Ω	
R11	470K	
R12	270Ω 1W	
R13	3300Ω	
R14	4700Ω	
R15	4.7meg	

ITEM No.	RATING	REMARKS
R16	10K	
R17	2200Ω 1W	
R18	56Ω	
R19	56Ω	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA PHILCO PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Tone Choke							100MH

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	PHILCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⓐ .38A	480 VCT ⓐ .055A	6.3Vⓐ 1.8A	32-8850-1	24R12U①	P-3147①		PC8419①	24R12U①	R-6A①

① Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	PHILCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	4300Ω CT	9Ω Tap ⓐ 3-4Ω	32-8849-1							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	PHILCO PART No.	QUAM PART No.	
SP1 SP2	6" Electrostatic	PM	3-4Ω	36-1663-9 36-1656-1	6A1	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA						REMARKS
	PHILCO PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.	
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1		89-TB*						* Includes needles & Mounting mechanism

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	PHILCO PART No.	JENSEN PART No.	WALCO PART No.	
M2		* S-61 † or * S-61SD ♦† or * S-61D ♦		† Jewel ♦ Diamond * Includes cartridge

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M3	Switch	42-1770-3	Function, Model G-1606L, M
	Switch	42-2095-1	Function, Model G-1606SL-123, SM-123
	45 RPM Spindle	76-10205-1	

CABINETS & CABINET PARTS

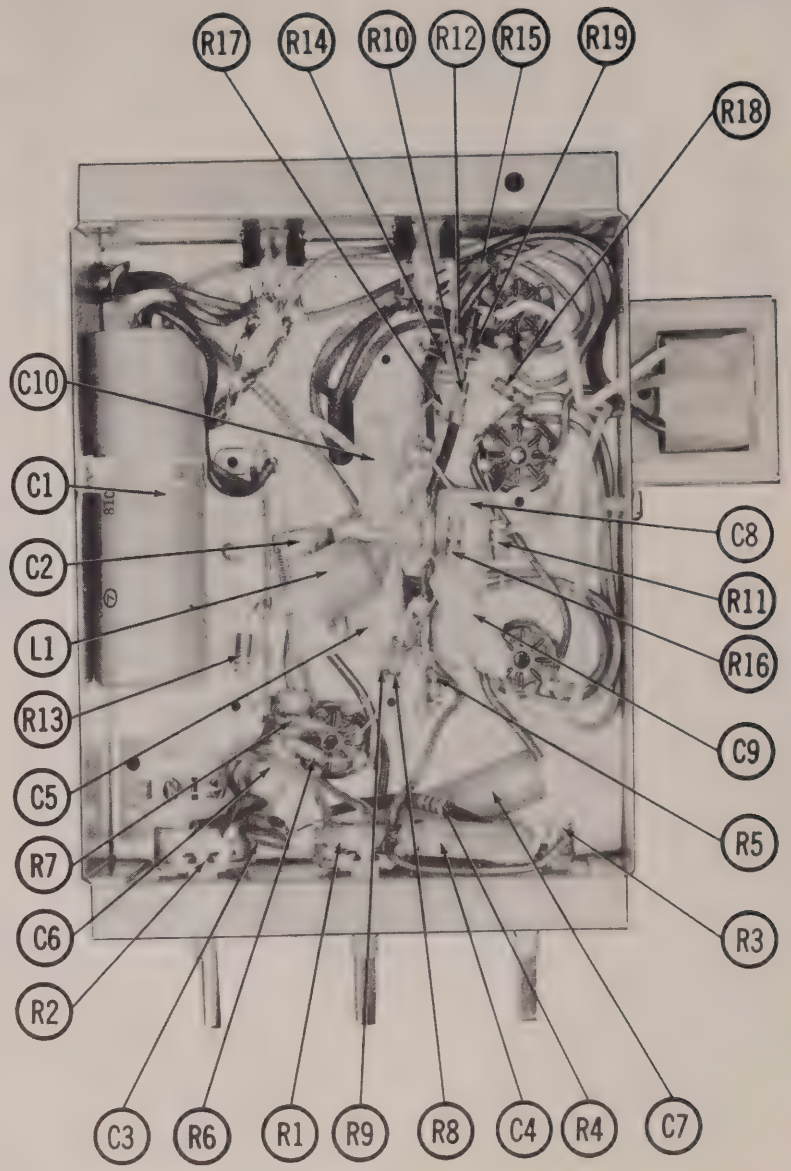
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

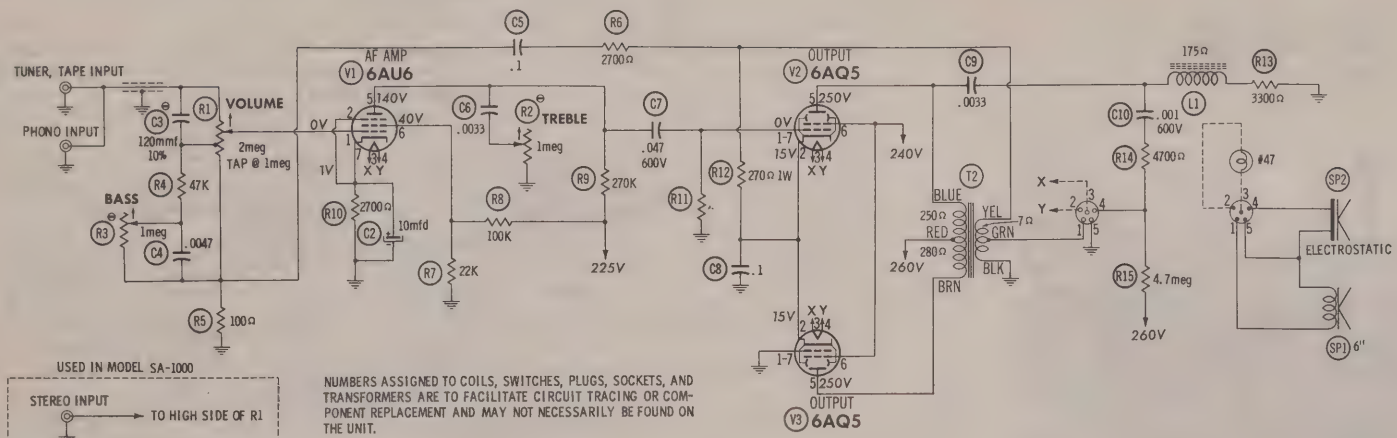
NAME	PART NO.	DESCRIPTION
Knob	54-6421-1	
Leg	424-0029-4	

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS BOTTOM VIEW



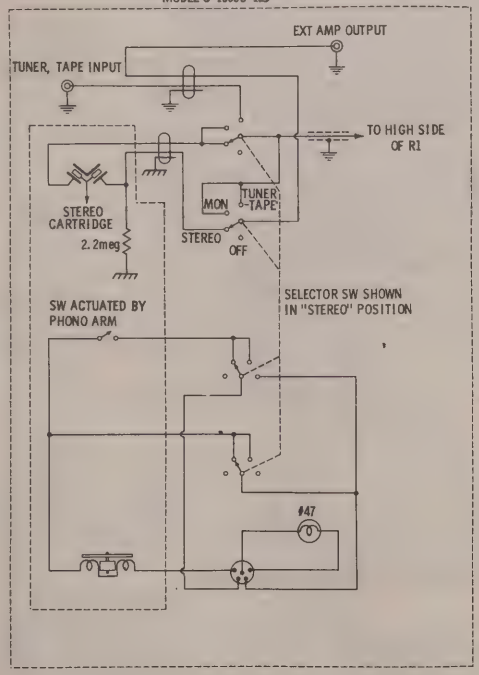


USED IN MODEL SA-1000

STEREO INPUT → TO HIGH SIDE OF R1

NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

ALT CIRCUIT USED IN MODEL G-1606S-123



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	6AU6	100Ω	2700Ω	35Ω	35Ω	†280K	†110K	2700Ω
V2	6AQ5	470K	270Ω	35Ω	35Ω	†250Ω	†2200Ω	470K
V3	6AQ5	0Ω	270Ω	35Ω	35Ω	†280Ω	†2200Ω	0Ω
V4	6X4	250Ω	NC	35Ω	35Ω	TP	230Ω	¶

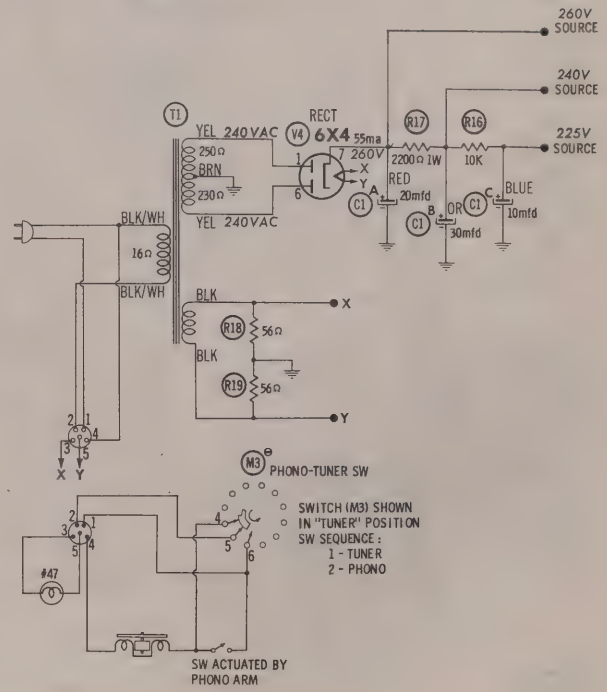
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V4
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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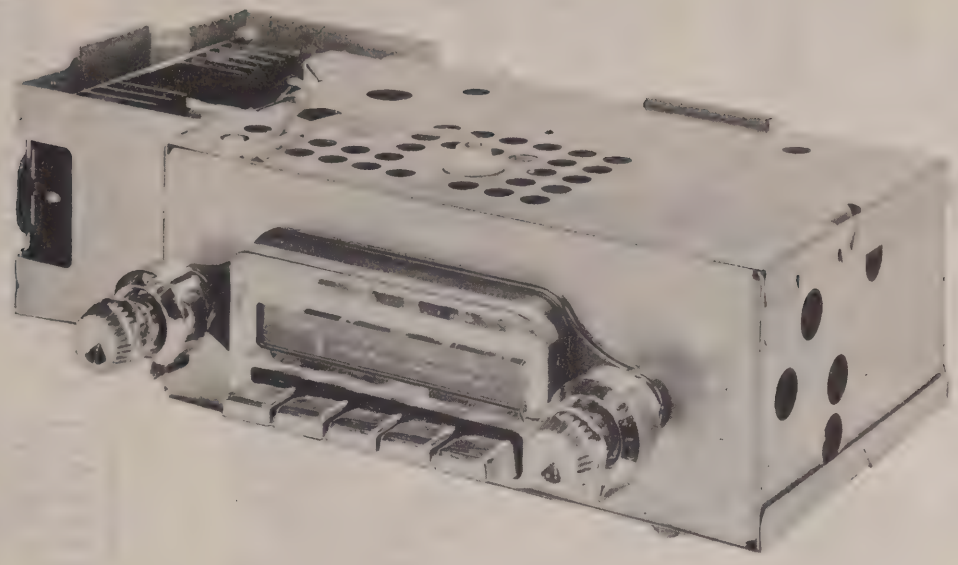
PHILCO MODELS G-1606L, M, G-1606SL-123, G-1606SM-123, SA-1000

PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

PONTIAC
MODEL 988976



TRADE NAME	Pontiac Model 988976 (For 1959 Pontiac Automobiles)
MANUFACTURER	Delco Radio Div., G.M. Corp., Kokomo, Indiana
TYPE SET	Battery Operated 4 Tube Custom Built AM Automobile Receiver With Transistorized Output
POWER SUPPLY	12 Volt Storage Battery
RATING	2 Amp. @ 12.6 Volts DC
TUNING RANGE	BROADCAST 540 –1615KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:

A1, A2, A3, A4..... GENERAL CEMENT #8282, 8606, 8606L, 9091
WALSCO #2526, 2541, 2543, 2544

A5, A9, A10..... GENERAL CEMENT #8607, 9291
WALSCO #2520, 2522, 2523, 2524, 2537

A6, A7, A8..... GENERAL CEMENT #5000, 5003, 8276, 8290
WALSCO #2512, 2525

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to pin 7 (grid) of converter. Low side to chassis.	262KC (400~ Mod.)	High end stop.	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
	Check setting of oscillator coil core (A5). The rear of the core should be 1 5/8" from the mounting end of coil form.						
2.	68mmf	High side to antenna receptacle. Low side to chassis.	1615KC	High end stop.	Across voice coil	A6, A7, A8	Adjust for maximum output.
3.	"	"	600KC	600KC Signal	"	A9, A10	"
4.	"	"	1615KC	High end stop.	"	A7, A8	Retouch for maximum output.
5.	"	"	1100KC	1100KC Signal	"		Adjust pointer adjustment until pointer coincides with 1100KC on dial.
6.	With radio installed in car and antenna fully extended, tune in a weak station near 900KC and adjust A8 for maximum output.						

PUSHBUTTON ADJUSTMENT

1. Pull Pushbutton to left and out.
2. Tune manually to desired station.
3. Press Pushbutton in firmly.
4. Repeat for remaining buttons.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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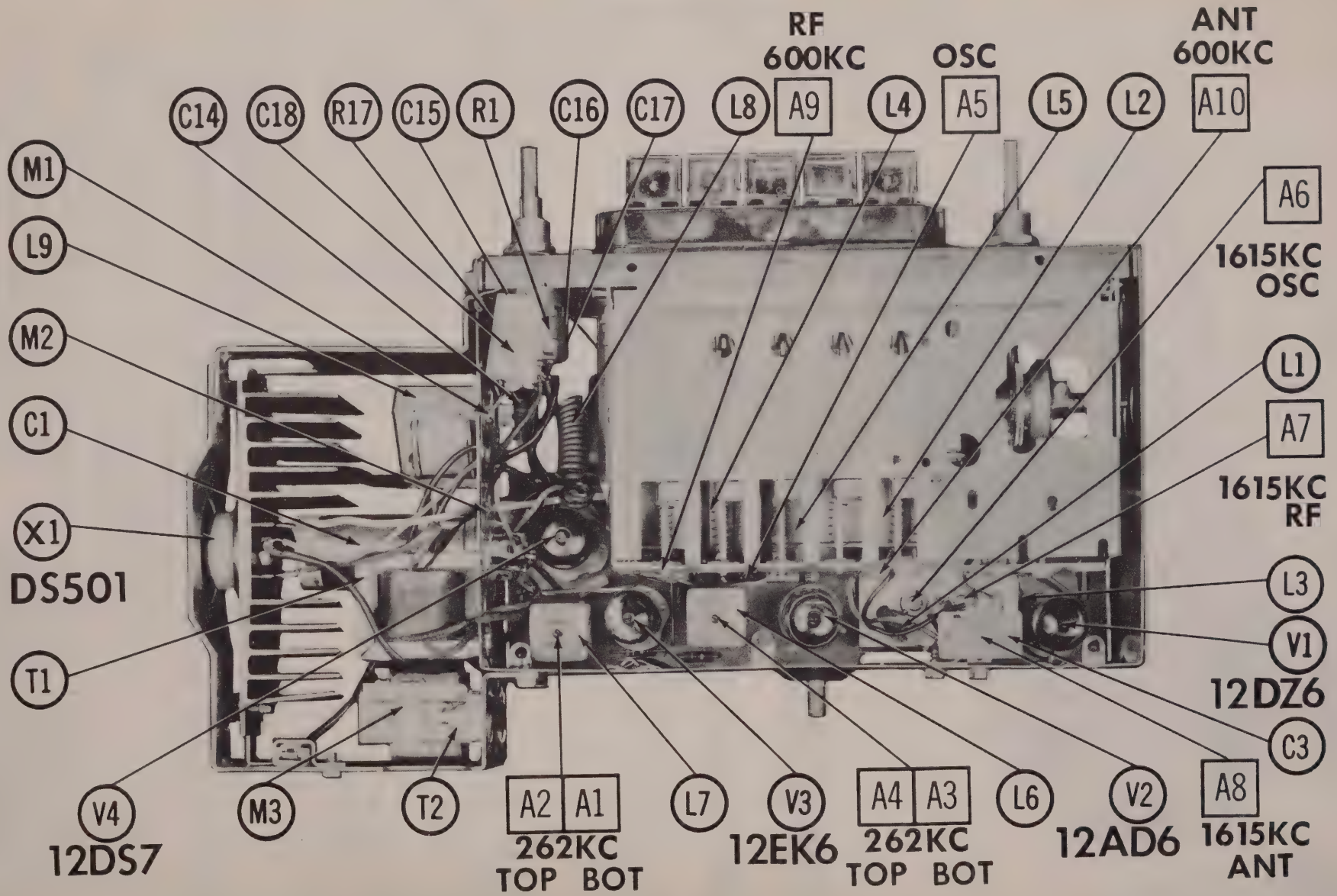
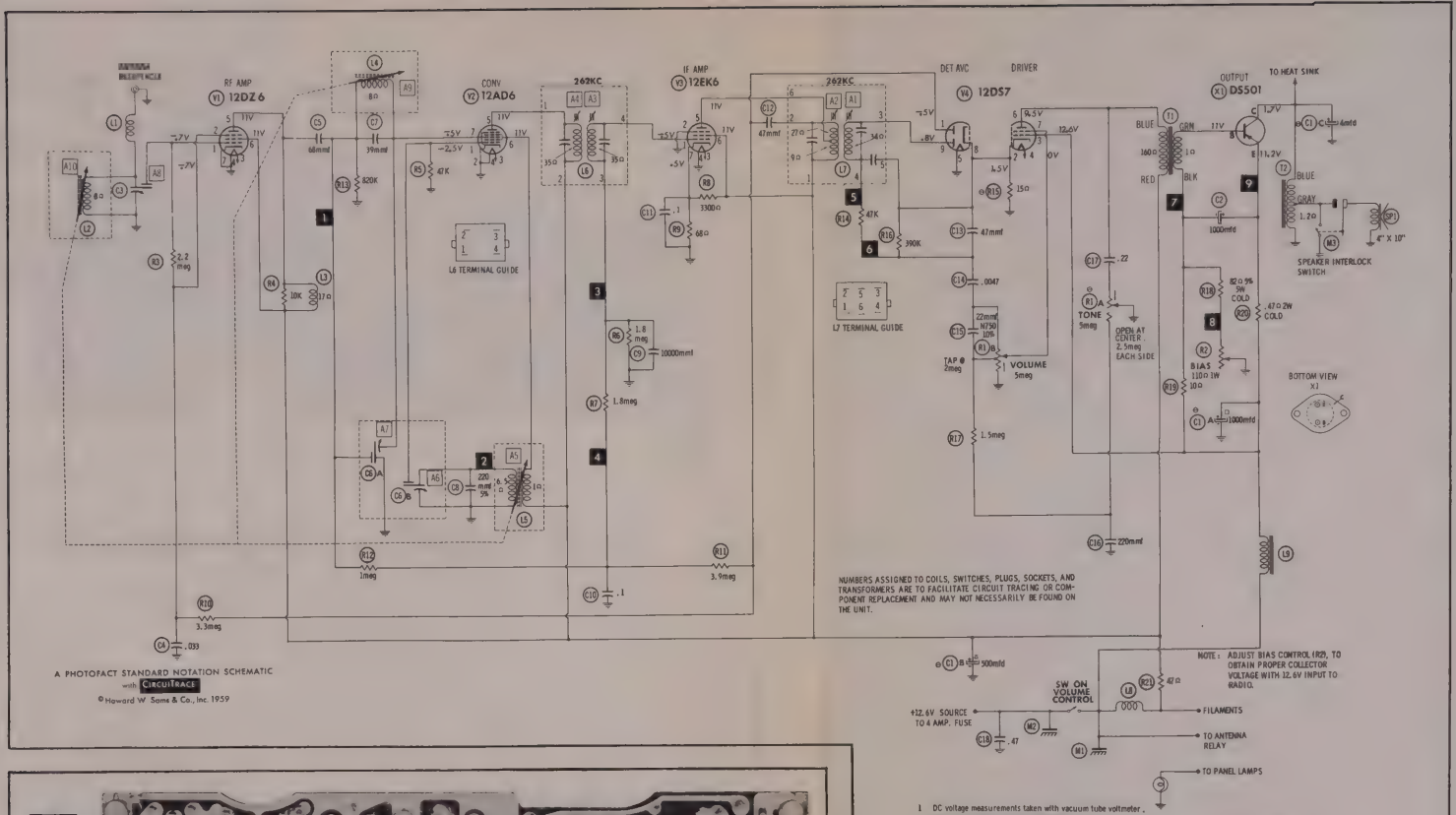
PONTIAC
MODEL 988976

PONTIAC
MODEL 988976

SET 460 FOLDER 17



CHASSIS TOP VIEW



A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACE
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1 DC voltage measurements taken with vacuum tube voltmeter.
2 Socket connections shown as bottom views.
3 Measured values are from socket pin to common negative.
4 Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE ON APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

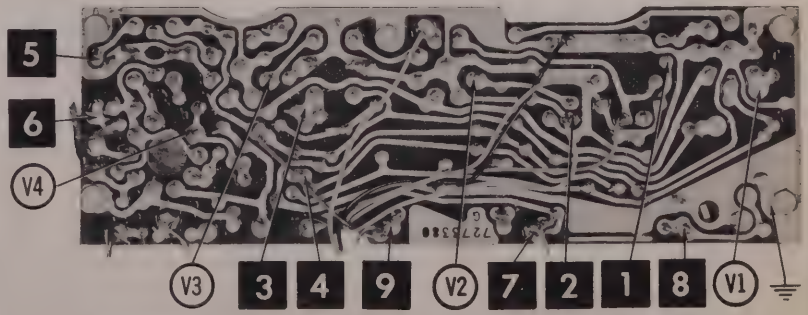
RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12DZ6	11meg	9.5meg	1.7Ω	0Ω	†65Ω	†47Ω	0Ω		
V2	12AD6	[illegible]	0Ω	1.7Ω	0Ω	[illegible]	†47Ω	800K		
V3	12EK6	1.2meg	0Ω	1.7Ω	0Ω	†57Ω	†47Ω	68Ω		
V4	12DS7	5meg	15Ω	†.6Ω	1.7Ω	0Ω	†200Ω	0Ω	15Ω	640K

TRANSISTOR CIRCUIT RESISTANCE NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

† MEASURED FROM JUNCTION OF R21 AND L8

PONTIAC
MODEL 988976



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PRINTED BOARD

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆

ITEM No.	USE	TYPE
V1	RF Amplifier	12DZ6
V2	Converter	12AD6
V3	IF Amplifier	12EK6
V4	Det. -AVC-Driver	12DS7

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	DS501	Output					PNP

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	DELCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	■1000	16	7273810 ①	AFH3-54-41		WP300.9		TVLS-3021.5*	
B	▲500	16							
C	4	16							
C2	1000	1	7271557	PRS6V1000	BBR1000-6	TC110	TD-1000-6	TVA-1104	

① Some versions may use 850-400-4 mfd@16-16-32V (Part #7273729)
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	DELCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3				7268558						
C4	.033	200		7273772	P288N-033		CUB6S33	GEM-2133	6TM-S33	
C5	68			6369	BPD-000068	DD-680	L10Q68	UC-5468	5GA-Q68	
C6A				7273693						
B										
C7	39			6366	DI-39	DD-390	L10Q39	UC-5439	5GA-Q39	
C8	220		5%	7273511	1469-00022	TCZ-220	5W5T22		1FM-322	
C9	10000			7273774	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C10	.1	200		6690	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C11	.1	200		6690	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C12	47			6367	1468-000047	D6-470	5W5Q47	UC-5447	1FM-447	
C13	47			6367	1468-000047	D6-470	5W5Q47	UC-5447	1FM-447	
C14	.0047	200		7271556	P288N-0047	D6-472	CUB6D47	GEM-6247	6TM-D47	
C15	22		N750 10%	6363	N750-DI 22	DTN-22	C10Q22U	CN7-422	5TCU-Q22S 10%*	

CAPACITORS (cont)

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	DELCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C16	220			6375	BPD-00022	DD-221	L10T22	B-322	5GA-T22	
C17	.22	100		7271555	P288N-22		CUB2P22	GEM-2022	2TM-P22	
C18	.47	50		7269780	P288N-47		CUB2P47	GEM-2047	2TM-P47	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	DELCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	5meg*	½	7273623					Tone
B	5meg	½						Volume, Tap@2meg
C	Switch							Off-On
R2	110Ω	1(WW)	7273776				PFL-100	Bias

* Open at center, 2.5meg each side.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R3	2.2meg	
R4	10K	
R5	47K	
R6	1.8meg	
R7	1.8meg	
R8	3300Ω	

* Alternate

ITEM No.	RATING	REMARKS
R9	68Ω	
R10	3.3meg	
R11	3.9meg	
R12	1meg	
R13	820K	
R14	47K	

ITEM No.	RATING	REMARKS
R15	15Ω (18Ω)*	
R16	390K	
R17	1.5meg	
R18	82Ω 5% Cold 5W	#7274033
R19	10Ω	
R20	.47Ω Cold 2W	#7270608
R21	47Ω	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		DELCO PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Ant. Coil	7255738	19-1004	19-1004	BC-565	4610		
L2	Ant. Tuning Coil	1221138						
L3	RF Choke	7269684						1.8MH
L4	RF Tuning Coil	1221138						
L5	Osc. Tuning Coil	1221151						
L6	Input IF	1221257	16-6756	16-6756	BC-344	13-PH1		
L7	Output IF	1221253						
L8	Fil. Choke	1217846						1.4uh

PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ~)	DELCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L9	.92A	.75Ω	.011 HY	7271321				TC-2		

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	DELCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	13	1	7274354			TA-51			

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE	REPLACEMENT DATA							NOTES
	PRI.	DELCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	9Ω Tap@ 3-4Ω	7273626							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	DELCO PART No.	QUAM PART No.	
SP1	4"x 10"	PM	5-6Ω	7272752		

MISCELLANEOUS

ITEM No.	PART NAME	DELCO PART No.	NOTES
M1	Spark Plate	7271564	
M2	Spark Plate	7271564	
M3	Switch	7271425	Speaker Interlock
	Printed Board	7273380	

CABINETS & CABINET PARTS

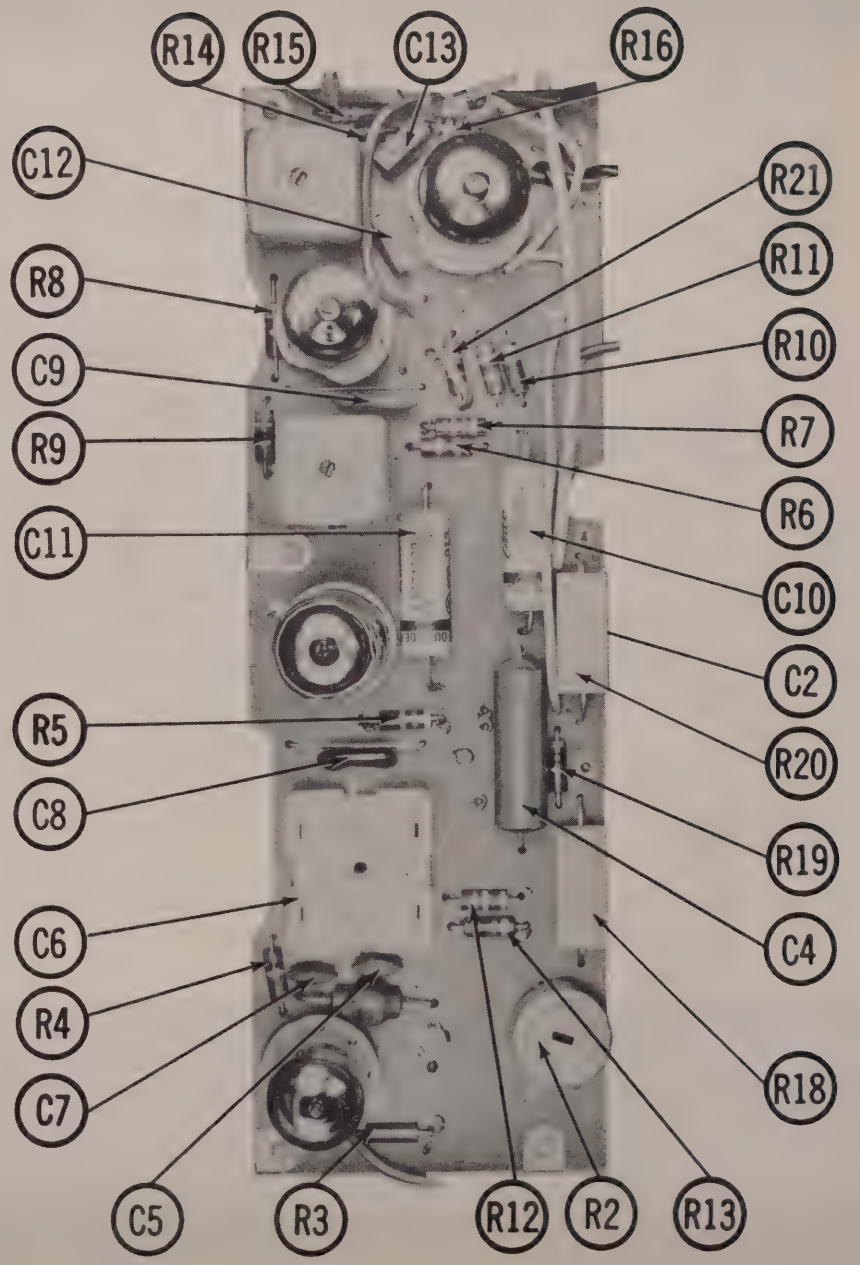
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	532456	Control
Knob	532455	Tone
Knob	532707	Dummy
Pushbutton Assembly	1221284	Includes Front Bearing Plate & Slides, & Push Buttons
Pushbutton	7273140	
Pointer	7273355	
Escutcheon Assembly	7273187	Includes Dial, Calibrated & Backplate, Dial

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Shielded Hook-up Wire ..... Use BELDEN No. 8885
Bonding Strap ..... Use BELDEN No. 8661

PRINTED BOARD



PHOTOFACT* Folder with CIRCUITRACE*

SILVERTONE MODELS 9002, 9003, 9004, 9005, 9006 (Ch. 132.44300, 132.44400)

SILVERTONE MODELS 9002, 9003, 9004, 9005, 9006 (Ch. 132.44300, 132.44400)

MODEL 9006

SILVERTONE MODELS 9002, 9003, 9004, 9005, 9006 (Ch. 132.44300, 132.44400)

TRADE NAME	Silvertone Models 9002, 9003 (Ch. 132.44300); 9004, 9005, 9006 (Ch. 132.44400)
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois
TYPE SET	AC-DC Operated 5 Tube AM Receiver
POWER SUPPLY	110-120 Volts AC-DC — RATING 30 Watts, .32 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	520KC-1690KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A1, A2, A3, A4, A6 ... GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545
A5, A7 ..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to antenna stator lug of tuning gang. Low side to B-	455KC (400~ Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1600KC	1600KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	600KC	600KC	"	A6	"
4.		"	1400KC	1400KC	"	A7	"

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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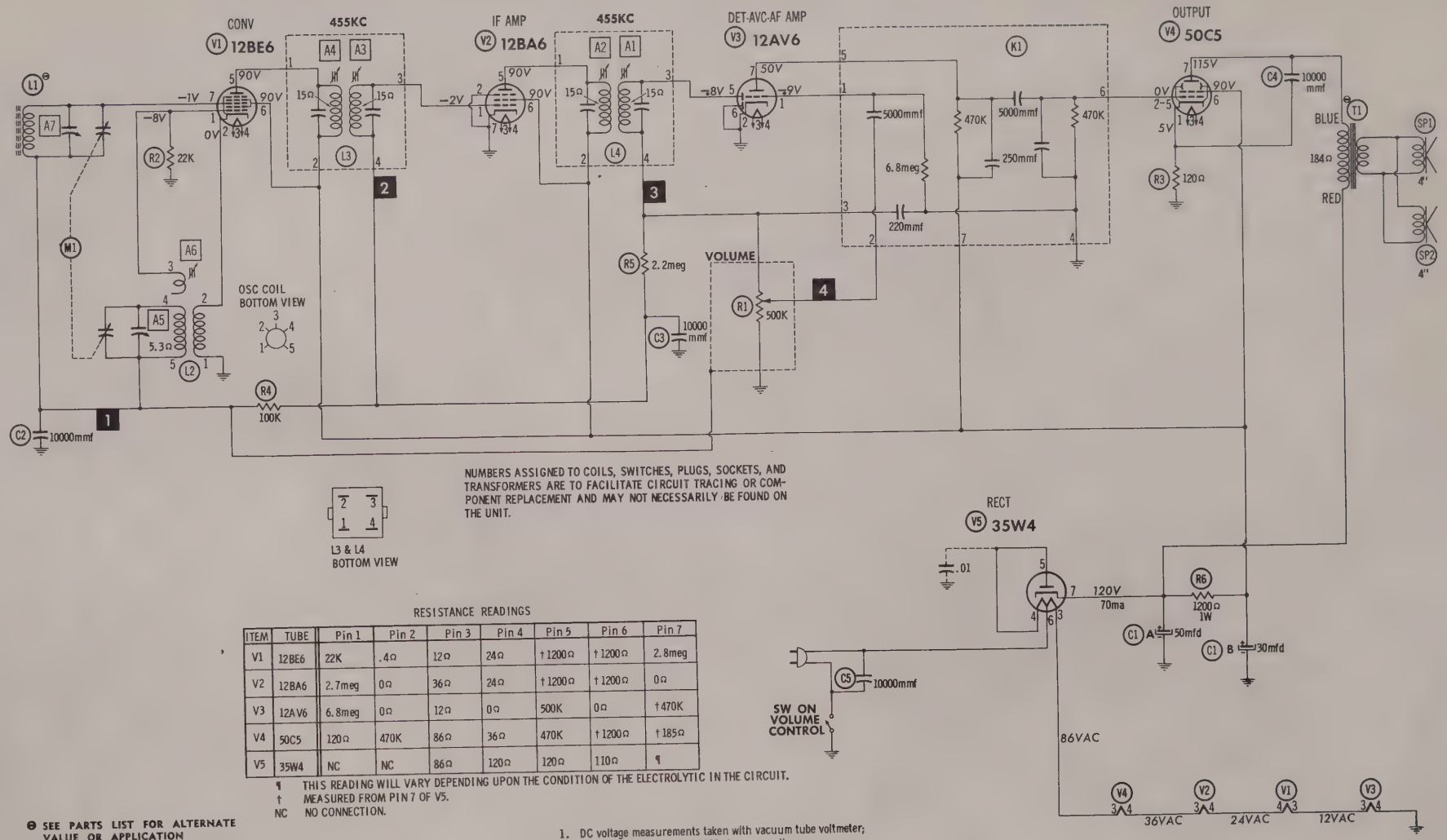
JG122

SET 460 FOLDER 18



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	.4Ω	12Ω	24Ω	†1200Ω	†1200Ω	2.8meg
V2	12BA6	2.7meg	0Ω	36Ω	24Ω	†1200Ω	†1200Ω	0Ω
V3	12AV6	6.8meg	0Ω	12Ω	0Ω	500K	0Ω	†470K
V4	50C5	120Ω	470K	86Ω	36Ω	470K	†1200Ω	†185Ω
V5	35W4	NC	NC	86Ω	120Ω	120Ω	110Ω	¶

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT.
† MEASURED FROM PIN 7 OF V5.
NC NO CONNECTION.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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SILVERTONE MODELS 9002, 9003, 9004, 9005, 9006 (Ch. 132.44300, 132.44400)

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amp.	12BA6	
V3	Det.-AVC-AF Amp.	12AV6	

ITEM No.	USE	TYPE	NOTES
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	50	150	44328-4	PRS150V5030	BBRD5315	WD210	TDLD-8		
B	30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	10000			43674-1	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C3	10000			43674-1	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C4	10000			43674-1	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C5	10000			43674-1	BPD-01	DD-103	BYA10S1	B-110	5HK-S1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SILVERTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	500K	½	45250-3					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		SILVERTONE PART No.	NOTES
	OHMS	WATT		
R2	22K		43687-223	
R3	120Ω		43689-121	
R4	100K		43687-104	

ITEM No.	RATING		SILVERTONE PART No.	NOTES
	OHMS	WATT		
R5	2.2meg		43687-225	
R6	1200Ω	1	43688-122	

COILS (RF-IF)

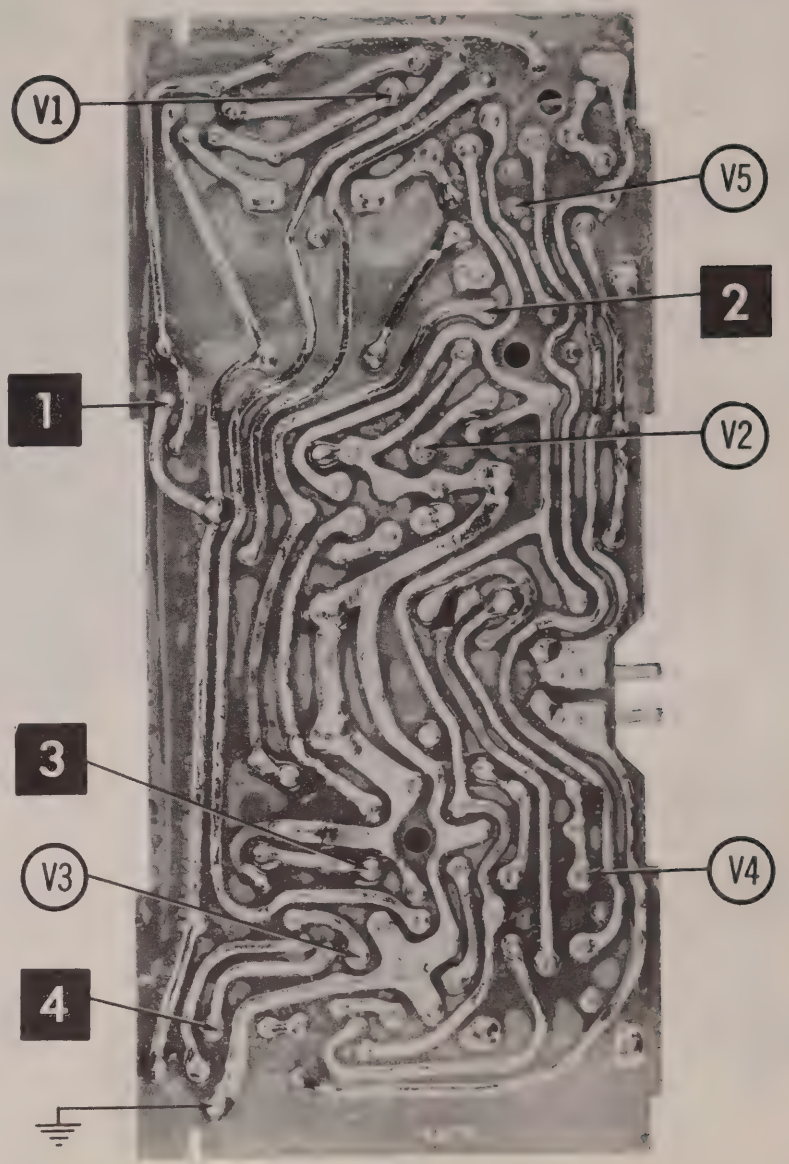
ITEM No.	USE	REPLACEMENT DATA						NOTES
		SILVERTONE PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	45534-3 †						
L2	Osc. Coil	43644-1						
L3	Input IF	44282-1	16-6780	16-6780	BC-356	13-PC9	RF-4	
L4	Output IF	44282-1	16-6780	16-6780	BC-357	13-PC10	RF-4	

† Models 9002 and 9003 use Part #45735-1 in this application.

PRINTED BOARD

A Howard W. Sams CIRCUITRACE Photo

ARROWS INDICATING TUBE LOCATIONS ARE POINTING TO PIN 1 UNLESS OTHERWISE INDICATED



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2700Ω	3-4Ω	42700-5 ①	26S58	A-3025	AU-605	A-3332	26S58	S-12X	① Alternate Part #42700-21.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SILVERTONE PART No.	QUAM PART No.	
SP1	4"	PM	6-8Ω	45600-6 ①	4A1Z6.4 ①	① Connect in parallel and phase.
SP2	4"	PM	6-8Ω	45600-6 ①	4A1Z6.4 ①	② Used in Models 9002, 9003
	4"	PM	3-4Ω	45600-4 ②		

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SILVERTONE PART No.	REPLACEMENT DATA	
K1	Audio Coupling Network	220mmf, 250mmf, 5000mmf, 5000mmf, 470K, 470K, 6.8meg	43743-2	Aerovox Centralab Sprague	PA-512-3 PC-158 DT-5

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M1	Tuning Cap. Tuning Cap. Printed Board	46175 45647 45975-1	2 Gang, Ch. 132.44400 2 Gang, Ch. 132.44300

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

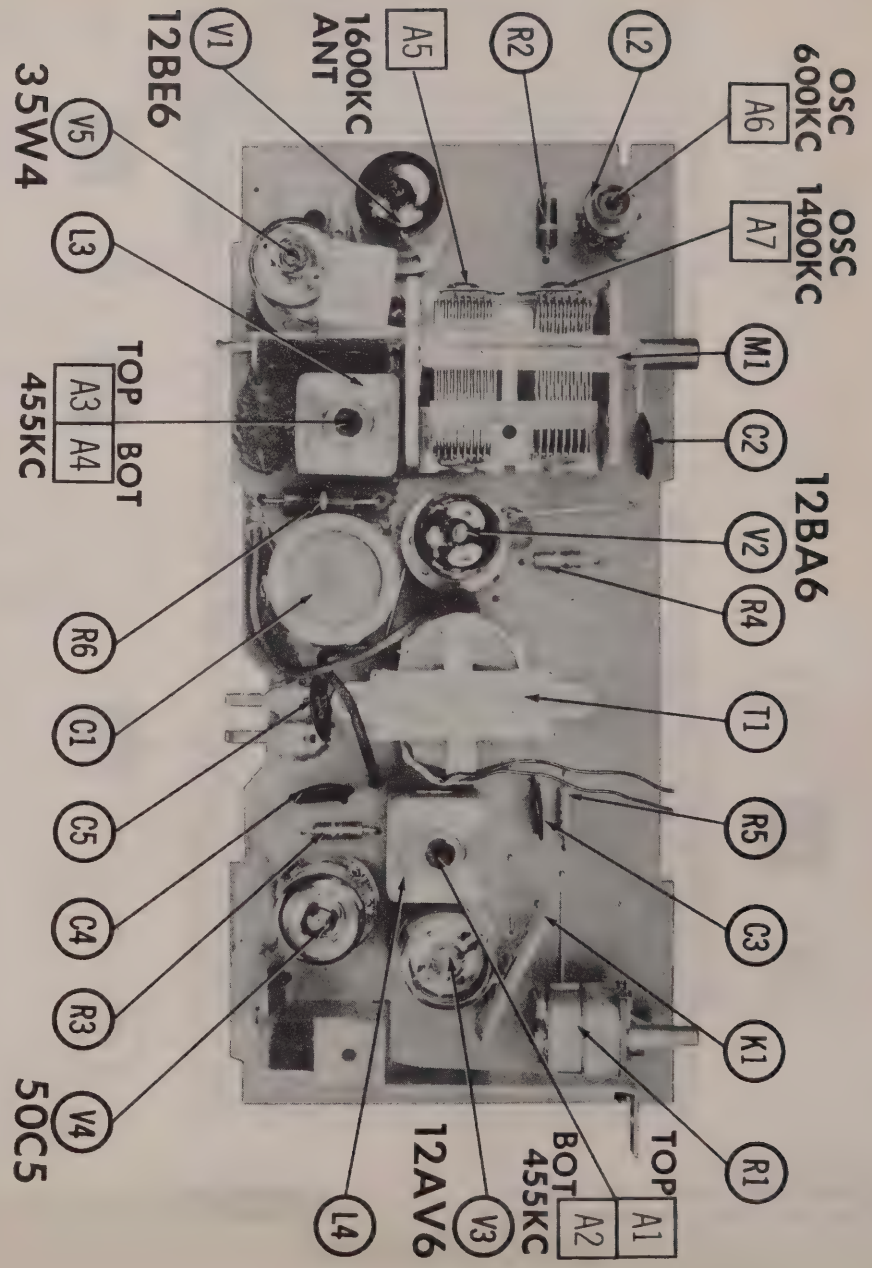
NAME	PART NO.	DESCRIPTION
Knob	45983-48	Tuning, Brown, Model 9004
Knob	45983-17	Tuning, Ivory, Model 9005
Knob	45983-66	Tuning, Sage Green, Model 9006
Knob	45661	Tuning, Volume-On-Off, Models 9002, 9003
Knob	45965-48	Volume On-Off, Brown, Model 9004
Knob	45965-17	Volume On-Off, Ivory, Model 9005
Knob	45965-66	Volume On-Off, Ivory, Model 9006
Cabinet Assembly	45962-48	Brown, Model 9004
Cabinet Assembly	45962-17	Ivory, Model 9005
Cabinet Assembly	45962-66	Sage Green, Model 9006
Cabinet	45660-48	Brown, Model 9002
Cabinet	45660-17	Ivory, Model 9003

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord (Interlock Type) ..... Use BELDEN No. 8874

CHASSIS—TOP VIEW



PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

SONY
MODEL TR-610

SONY
MODEL TR-610

SONY
MODEL TR-610

TRADE NAME	Sony Model TR-610
IMPORTER	Delmonico International Corp., 42-24 Orchard St., Long Island City 1, N. Y.
TYPE SET	Battery Operated Transistorized Portable AM Receiver
POWER SUPPLY	9 Volts DC
TUNING RANGE—BROADCAST	530-1650KC
RATING	6.1MA @ 9 Volts DC (No Signal, Min. Volume) 7MA @ 9 Volts DC (Signal, Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools: A4, A5..... GENERAL CEMENT #9087, 9089
WALSCO #2528
A6..... GENERAL CEMENT #9440

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1650KC	"	"	A4, A5	"
3.		"	600KC	600KC	"	A6	"

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of JF190

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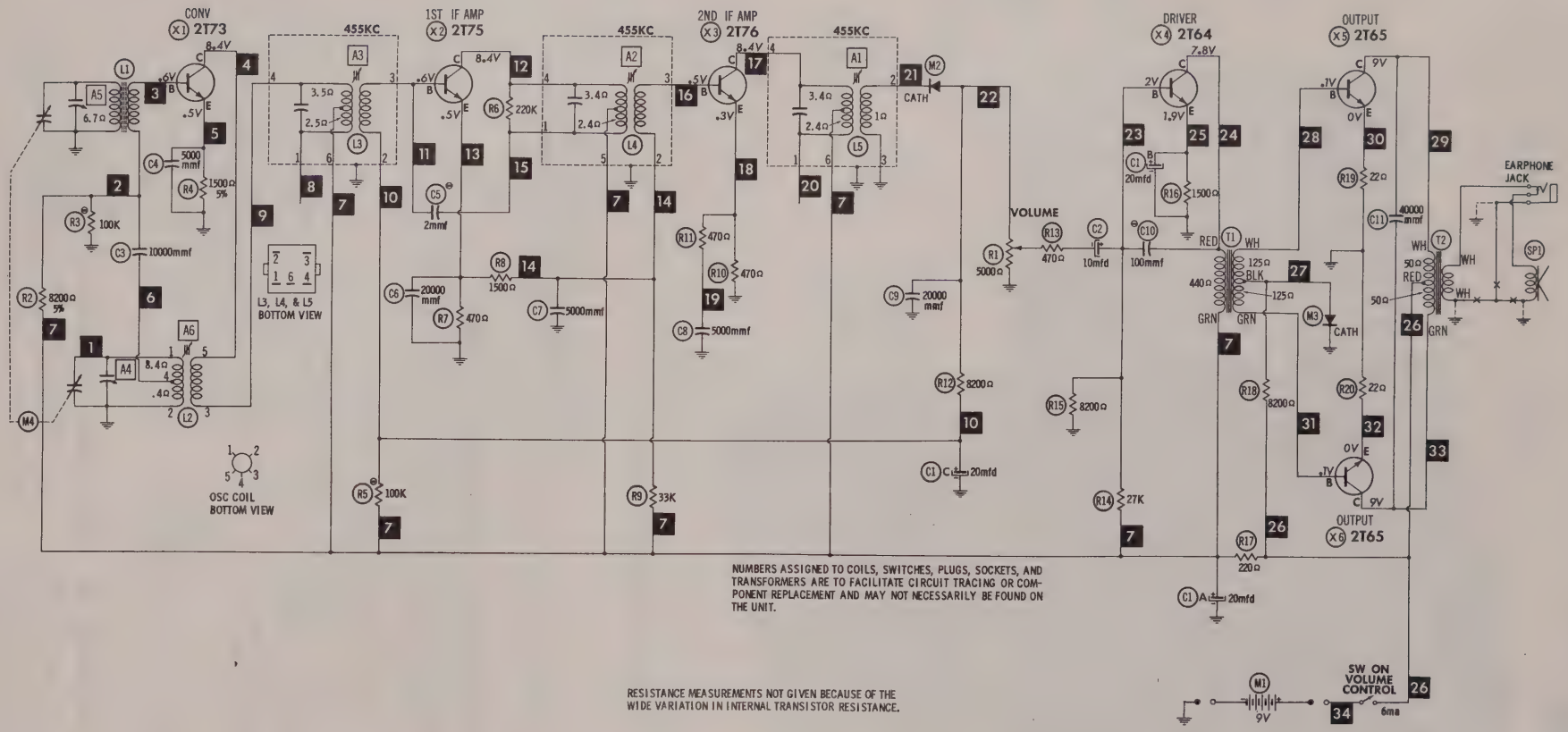
SET 460 FOLDER 19



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
with CIRCUITRACE®

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SONY
MODEL TR-610

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2T73	Converter					NPN
X2	2T75	1st IF Amplifier					NPN
X3	2T76	2nd IF Amplifier					NPN
X4	2T64	Driver					NPN
X5	2T65	Output	2N438				NPN } Matched
X6	2T65	Output	2N438				NPN } Matched

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	SONY PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	20	10							
B	20	10							
C	20	10							
C2	10	3		XPP-3010	NLW10-6	TT3X10	ML10-6	TE-1053	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	SONY PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	10000				BPD-01	DD-103	H-05S1	TA-110	TG-S10	
C4	5000				BPD-005	DD-502	H-05D5	TA-250	TG-D50	
C5	2				NPO-SI 2	TCZ-2R2	C10V2C	CNO-522	5TCCB-V22	Note 1
C6	20000				BPD-02	DD-203	BYB6S2	TA-120	TG-S20	
C7	5000				BPD-005	DD-502	H-05D5	TA-250	TG-D50	
C8	5000				BPD-005	DD-502	H-05D5	TA-250	TG-D50	
C9	20000				BPD-02	DD-203	H-05S2	TA-120	TG-S20	
C10	100				BPD-0001	DTZ-100	C10T1C	CNO-310	5TCCB-T1	Note 2
C11	40000					DF-403	BYB6S4			

Note 1. Some versions may use 3mmf in this application.

Note 2. Some versions may use 300mmf in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SONY PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/10		B16-216				Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		SONY PART No.	NOTES
	OHMS	WATT		
R2	8200Ω 5%			
R3	100K			Note 1
R4	1500Ω 5%			
R5	100K			Note 2
R6	220K			
R7	470Ω			
R8	1500Ω			
R9	33K			
R10	470Ω			
R11	470Ω			

Note 1. Some versions may use 82K in this application.

ITEM No.	RATING		SONY PART No.	NOTES
	OHMS	WATT		
R12	8200Ω			
R13	470Ω			
R14	27K			
R15	8200Ω			
R16	1500Ω			
R17	220Ω			
R18	8200Ω			
R19	22Ω			
R20	22Ω			

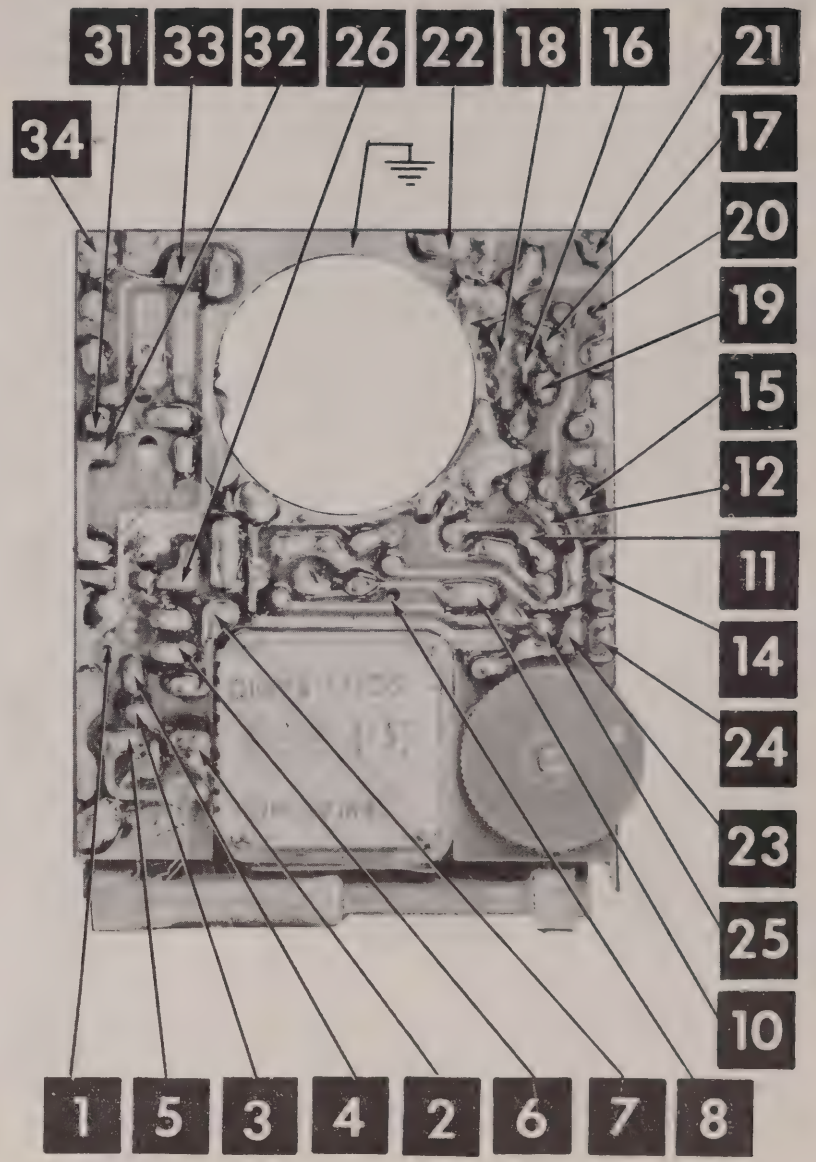
Note 2. Value may vary, use original value.

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	SONY PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1	1	TR63-11						

PRINTED BOARD

A Howard W. Sams CIRCUITRACE® Photo



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	SONY PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	2200Ω CT	10Ω	TR63-10							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SONY PART No.	QUAM PART No.	
SP1	2 1/4"	PM	10-11Ω	TR63-1		

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		SONY PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick							
L2	Osc. Coil							
L3	1st IF Trans.							
L4	2nd IF Trans.							
L5	3rd IF Trans.							

BATTERIES

ITEM No.	VOLTAGE	SONY PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V			2U6		216		TR-146R	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		SONY PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2		1R63-16	1N60	1N60	1N295	Det. (Pigtail)
M3		1T52	1N60	1N60	1N295	Bias (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	SONY PART No.	NOTES
M4	Tuning Cap	TR63-5	2 Gang

CABINETS & CABINET PARTS

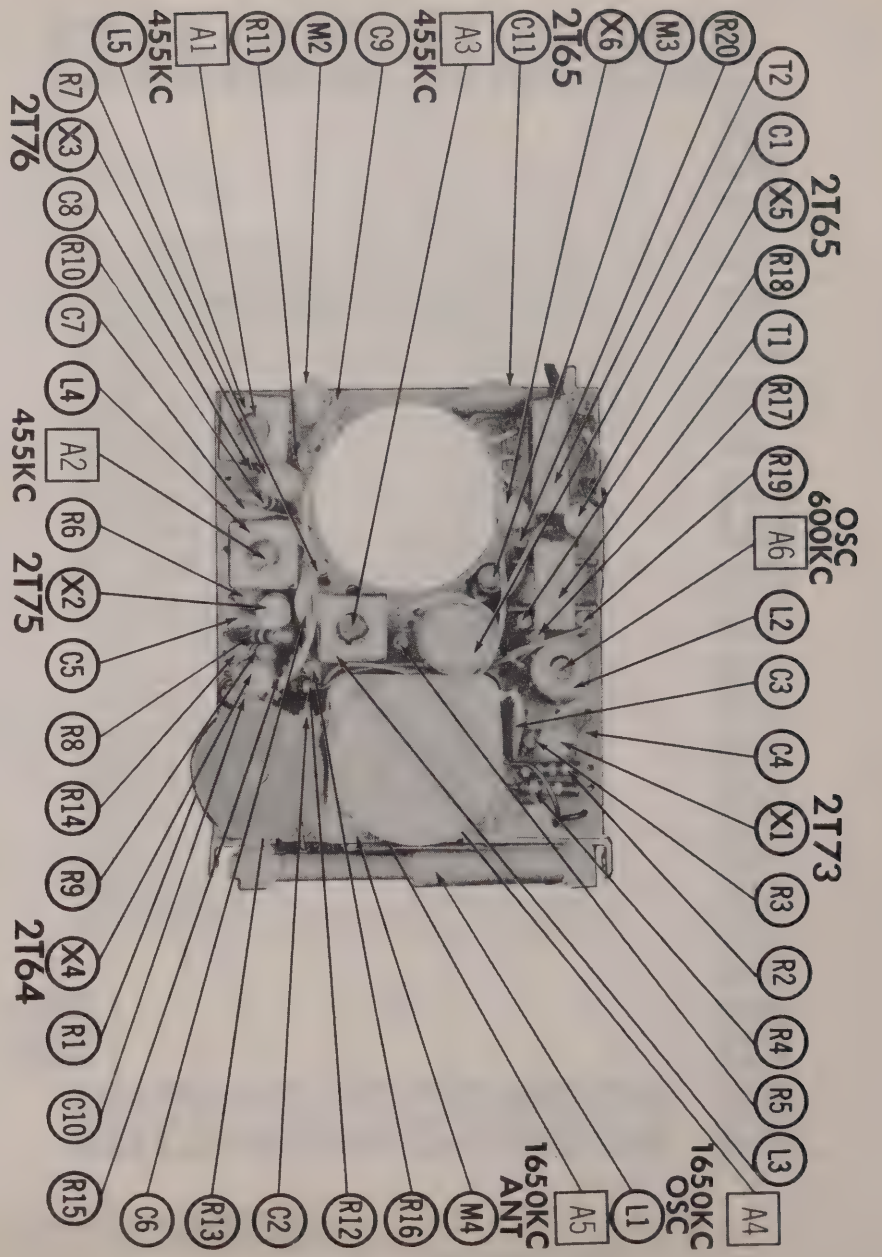
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	TR63-8	Tuning
Knob	TR63-7	Volume
Cabinet	TR63-9	

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW

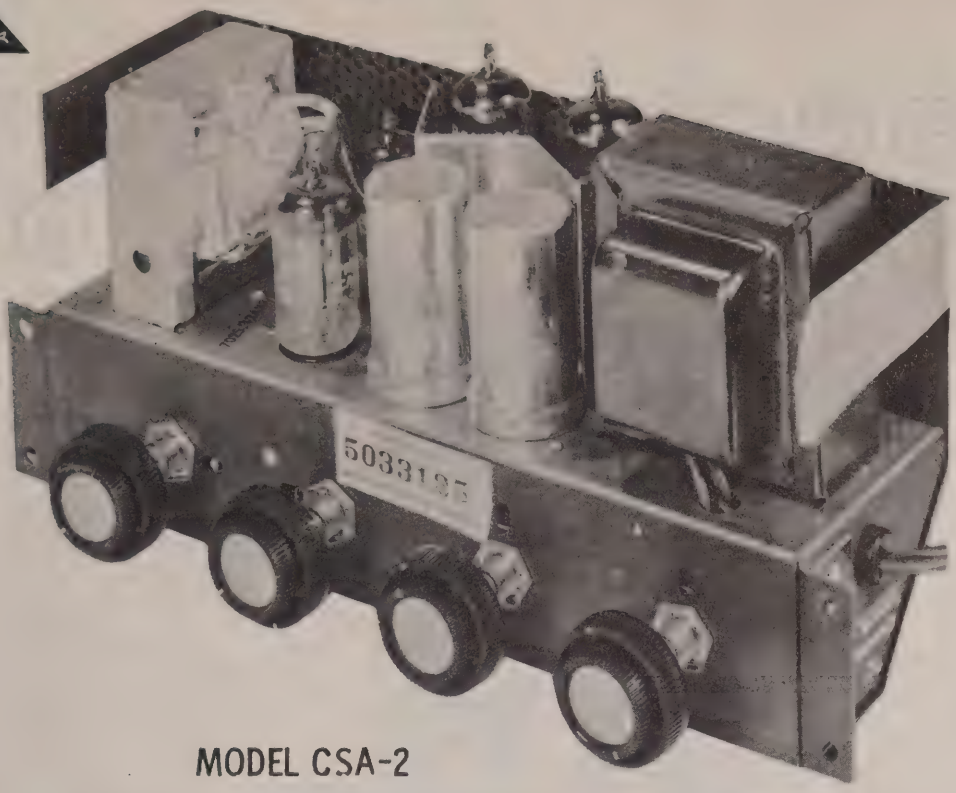


PHOTOFACT* Folder

EIA

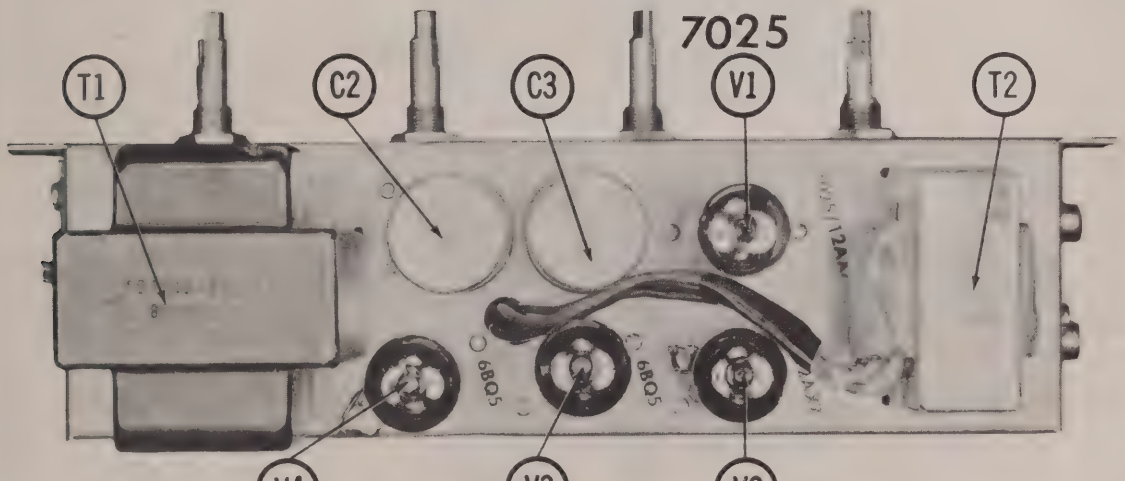
**STROMBERG-CARLSON
MODELS CSA-1, CSA-2**

STROMBERG-CARLSON
MODELS CSA-1, CSA-2



MODEL CSA-2

TRADE NAME	Stromberg-Carlson Models CSA-1, CSA-2
MANUFACTURER	Stromberg-Carlson Co., Special Products Div., 1400 N. Goodman St., Rochester 9, N.Y.
TYPE SET	AC Operated 4 Tube Audio Amplifier
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 46 Watts, .52 Amp. @ 117 Volts AC



EL84
6BQ5

EL84
6BQ5

ECC83
12AX7

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of JX294

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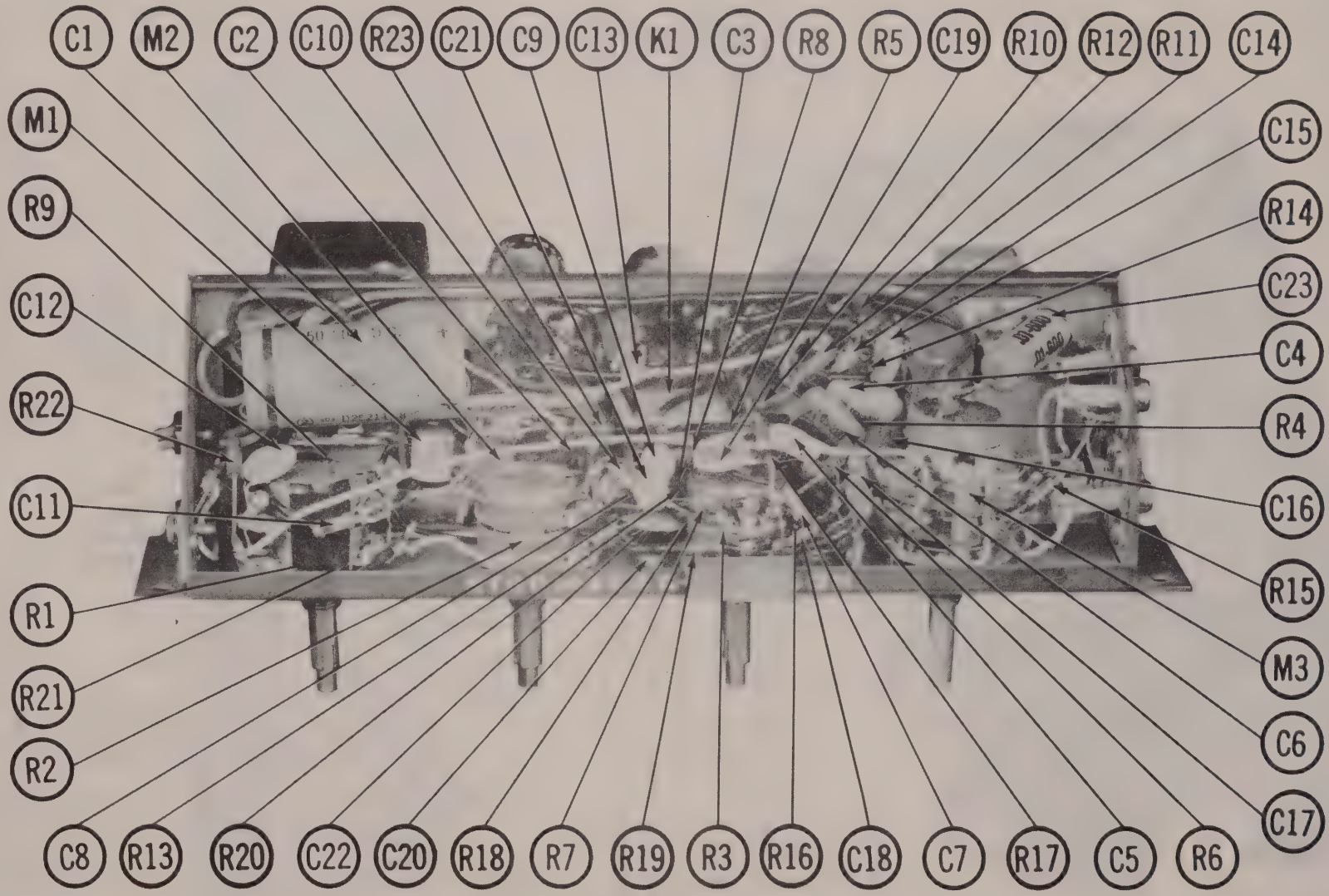


CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆

ITEM No.	USE	TYPE
V1	Channel A AF Amp. - Channel B AF Amp.	7025 (12AX7*)
V2	Channel A AF Amp. - Channel A Phase Inv.	ECC83/12AX7
V3	Channel A Output	EL84/6BQ5
V4	Channel A Output	EL84/6BQ5

* Alternate.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Stromberg-Carlson PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1	50	200	111000-049	PRS250V50	BR5025	TC59	TD-50-450	TVA-1713	
C2	■50	200	111000-018	AFH1-34	A0320	FP137	TMS-38	TVL-1522	
C3A	■20	350	111000-019	AFH2-84	B0610	FP227	TMD-73	TVL-2604	
B	▲25	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA Stromberg-Carlson PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	.05	200		552117-503	P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C5	4700				BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	①
C6	.05	200		552117-503	P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C7	2200				BPD-0022	DD-222	BYA10D22	B-222	5HK-D22	
C8	470				BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C9	1000				BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C10	4700				BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	
C11	47				SI 47	D6-470	L10Q47	UC-5447	5GA-Q47	
C12	4700				BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	
C13	4.7		10%		NPO-SI 4.7	TCZ-4R7	C10V47C	CNO-547	5TCCB-V47S 10%*	
C14	470		10%		DI-470	MD-471		JL-347	5GA-T47S 10% *	
C15	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C16	.05	200		552117-503	P288N- 05	DF-503	CUB2S5	GEM-415	2TM-S5	
C17	.05	200		552117-503	P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C18	2200				BPD-0022	DD-222	BYA10D22	B-222	5HK-D22	
C19	4700				BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	
C20	470				BPD-00047	DD-471	BYA10T47	B-347	5GA-T47	
C21	1000				BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C22	4700				BPD-0047	DD-472	BYA10D47M	B-247	5HK-D47	
C23	.01	600			P688N-01	D6-103	CUB6S1	GEM-611	6TM-S1	

① Not used in Model CSA-1.
* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Stromberg-Carlson PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg *		145000-036				UE1731	Volume, Channel B
B	1meg *						Not Req.	Volume, Channel A
R2A	1meg		145000-038				UE1729	Bass, Channel B
B	1meg						Not Req.	Bass, Channel A
R3A	1meg		145000-037				UE1729	Treble, Channel B
B	1meg						Not Req.	Treble, Channel A

* Tap ⓐ 250K.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R4	3.3meg	
R5	82K	
R6	3300Ω	Note 1
R7	330K	
R8	47K	
R9	47K	
R10	220K 5%	
R11	3900Ω	
R12	3.3meg	
R13	150Ω 2W	
R14	56K	
R15	82K	Note 1
R16	3.3meg	
R17	3300Ω	Note 1
R18	82K 5%	
R19	220K 5%	
R20	47K	
R21	12K 5%	Note 1
R22	270K 5%	Note 1
R23	10K	

Note 1. Not used in Model CSA-1.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Stromberg-Carlson PART No.	REPLACEMENT DATA
K1	Output Grid	10000mmf, 10000mmf, 220K, 220K, 470K, 470K	179000-031	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA Stromberg-Carlson PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V ⓐ .52A	125V ⓐ .250A (AC)	6.3V ⓐ 2.2A	161000-215						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Stromberg-Carlson PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	5300Ω CT	6-8Ω	161000-162	26S46 ①	A-2904 ①	AU-600 ①	A-3852①	26S46 ①	S-55Z ①	① Bend ears down.

RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA Stromberg-Carlson PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	NOTES
M1	.071A	162000-013 ①	HA504 ①	SD-94 ①	K200 ①		① Silicon Type
M2	.071A	162000-013 ①	HA504 ①	SD-94 ①	K200 ①		

MISCELLANEOUS

ITEM No.	PART NAME	Stromberg-Carlson PART No.	NOTES
M3	Switch	158000-129	Stereo Selector, Indludes Off-On Switch

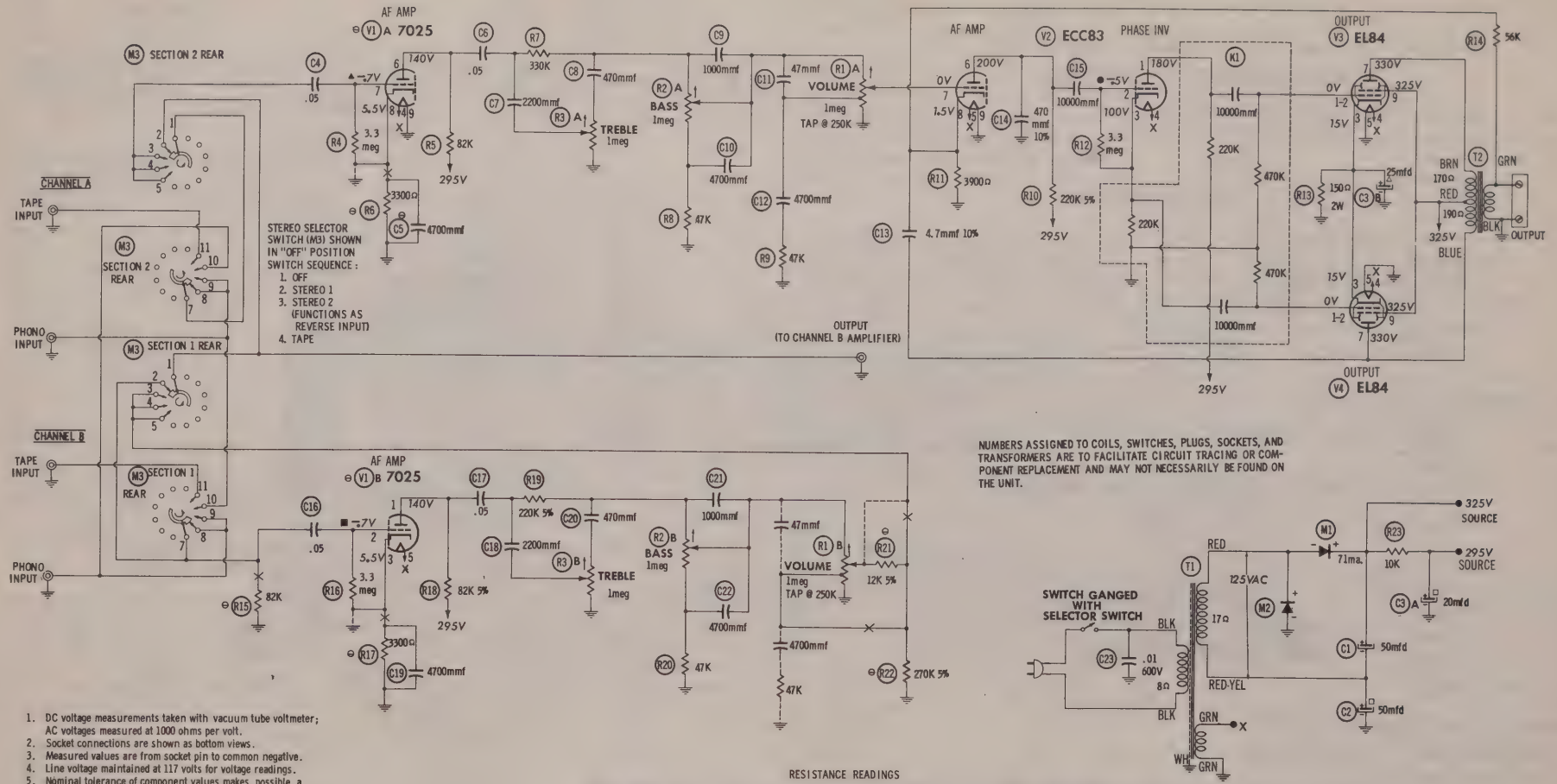
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	134000-009	Selector
Knob	134000-008	Volume, Tone (Large)
Knob	134000-007	Volume, Tone (Small)

STROMBERG-CARLSON
MODELS CSA-1, CSA-2

FOLDER 20



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of components makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	7025	†92K	3.3meg	3300Ω	.1Ω	.1Ω	†92K	3.3meg	3300Ω	0Ω
V2	ECC83 12AX7	†230K	3.5meg	220K	.1Ω	.1Ω	†230K	0Ω	3900Ω	0Ω
V3	EL84 6BQ5	470K	470K	150Ω	.1Ω	0Ω	NC	†170Ω	NC	†0Ω
V4	EL84 6BQ5	470K	470K	150Ω	.1Ω	0Ω	NC	†190Ω	NC	†0Ω

† MEASURED FROM OUTPUT OF M1.
▲ MEASURED FROM PIN 8 OF V1.
■ MEASURED FROM PIN 3 OF V1.
● MEASURED FROM PIN 3 OF V2.
NC NO CONNECTION

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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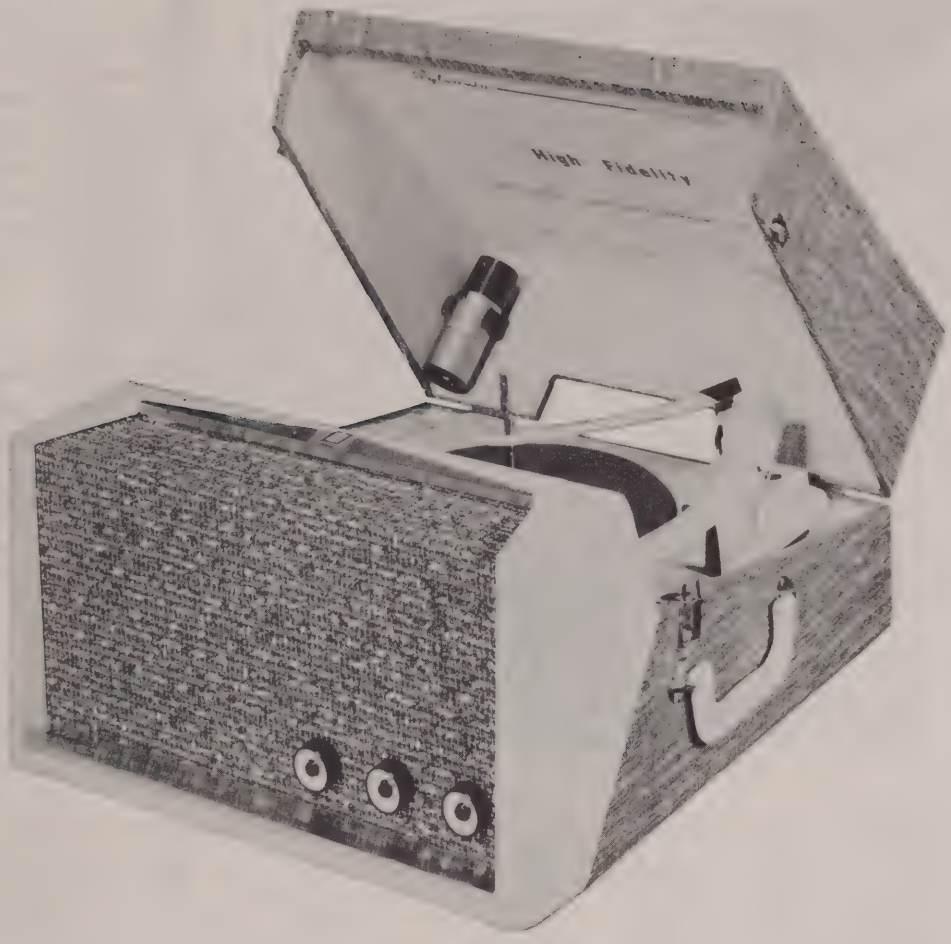
STROMBERG-CARLSON
MODELS CSA-1, CSA-2

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

SYLVANIA MODEL 4419 (Ch. 1-642-1)

SYLVANIA MODEL
4419 (Ch. 1-642-1)



SYLVANIA MODEL
4419 (Ch. 1-642-1)

TRADE NAME	Sylvania Model 4419 (Ch. 1-642-1)
MANUFACTURER	Sylvania Home Electronics, Div. of Sylvania Electric Products, Inc., 700 Ellicott St., Batavia, N. Y.
TYPE SET	AC Operated 3 Tube Phono Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	110-120 Volts AC, 60 Cycles RATING 32 Watts, .37 Amp. @ 117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE SIMILAR V-M 1200A - PHOTOFACT SET 353 FOLDER 16 OR RECORD CHANGER MANUAL RC-10.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America

JT264

SET 460 FOLDER 21

PARTS LIST AND DESCRIPTIONS

TUBES

ITEM No.	USE	TYPE	ITEM No.	USE	TYPE
V1	AF Amp. -Phase Inv.	12AX7	V3	Output	50C5
V2	Output	50C5			

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA SYLVANIA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	80	150		PRS150V8040-20	BBRT84215	TCT3117	TDLT-7	TVA-3455	
B	40	150							
C	20	150							
C2	5	50	①	PRS50V5	BBR5-50	TC30	TD-5-50	TVA-1303	

① Some versions may use 10mfd in this application.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA SYLVANIA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	1000				BPD-001	DD-102	BYA10D1M	B-210	5HK-D1	
C4	10000				BPD-01	DD-103	BYA10S1	B-110	5HK-S1	
C5	1800				DI-1800	DD-182	L10D18	B-218	5GA-D18	①
C6	.033	200			P288N-033		CUB6S33	GEM-4133	6TM-S33	
C7	2200				BPD-0022	DD-222	BYA10D22	B-222	5HK-D22	
C8	.056	400						GEM-6156	5BF-S56	②
C9	.056	400						GEM-6156	5BF-S56	②
C10	.1	400			P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C11	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C12	.047	400			P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	

① Some versions may use 1000mmf in this application.
② Some versions may use .047mfd @ 400V in this application.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA SYLVANIA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	2meg *	1/2	BA813-171	BT-174		Q18-139XX	UDT-295	Loudness
R2A	2meg	1/2	BA811-2758	B-75	A47-2meg-S	Q11-139	U56	Bass
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R3A	2meg	1/2	BA811-2758	B-75	A47-2meg-S	Q11-139	U56	Treble
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

* Taps @ 250K, 500K.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

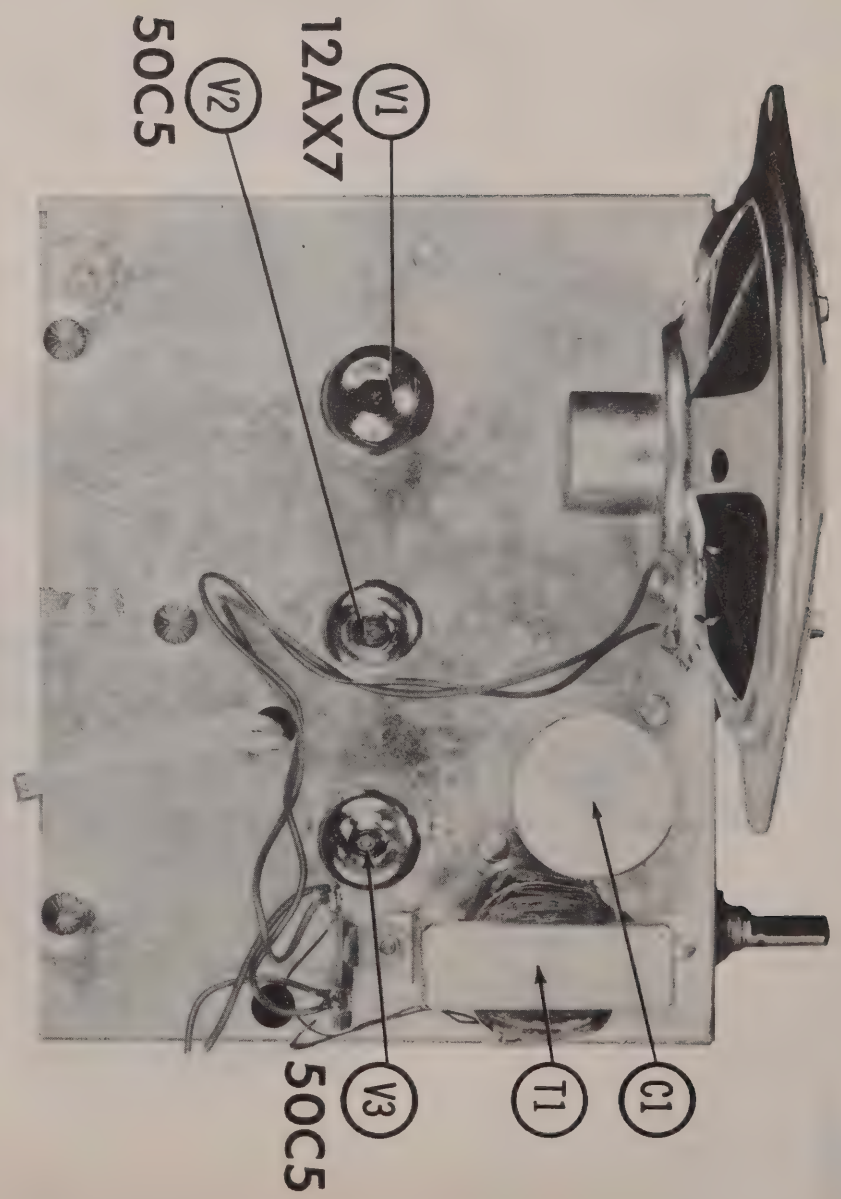
ITEM No.	RATING	REMARKS
R4	120K	
R5	180K	(18K)*
R6	100K	
R7	12K	
R8	3900Ω 1W	
R9	12K	

ITEM No.	RATING	REMARKS
R10	220K	
R11	220K	
R12	470K	
R13	470K	
R14	82Ω 1W	
R15	100K	

ITEM No.	RATING	REMARKS
R16	820Ω	
R17	100Ω 5W	
R18	15Ω 1W	
R19	15Ω 1W	
R20	33Ω 1W	

* Alternate.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	SYLVANIA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	4600Ω CT	1-2Ω	50516-1	24S60	A-2900	AU-608	A-3856	24S60	S-51X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SYLVANIA PART No.	QUAM PART No.	
SP1	6"	PM	3-4Ω		6A15	
SP2	4"	PM	3-4Ω		4A1	

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	SYLVANIA PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	SYLVANIA PART No.	
M1	.094A	①	HE154 ①	SD-94 ①	K200 ①		① Silicon Type.

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA						REMARKS
	SYLVANIA PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M2		13TB *						Includes needle and mounting

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	SYLVANIA PART No.	JENSEN PART No.	WALCO PART No.	
M3	78RPM	E98 † or E98X ♦	*W-101STD ♦ or *W-101STS † or *W-102S †	* Includes Cartridge † Jewel ♦ Diamond
	(LP)	E98D † or E98XD ♦		

MISCELLANEOUS

ITEM No.	PART NAME	SYLVANIA PART No.	NOTES
M4	Switch		Off-On-Reject (On Changer)

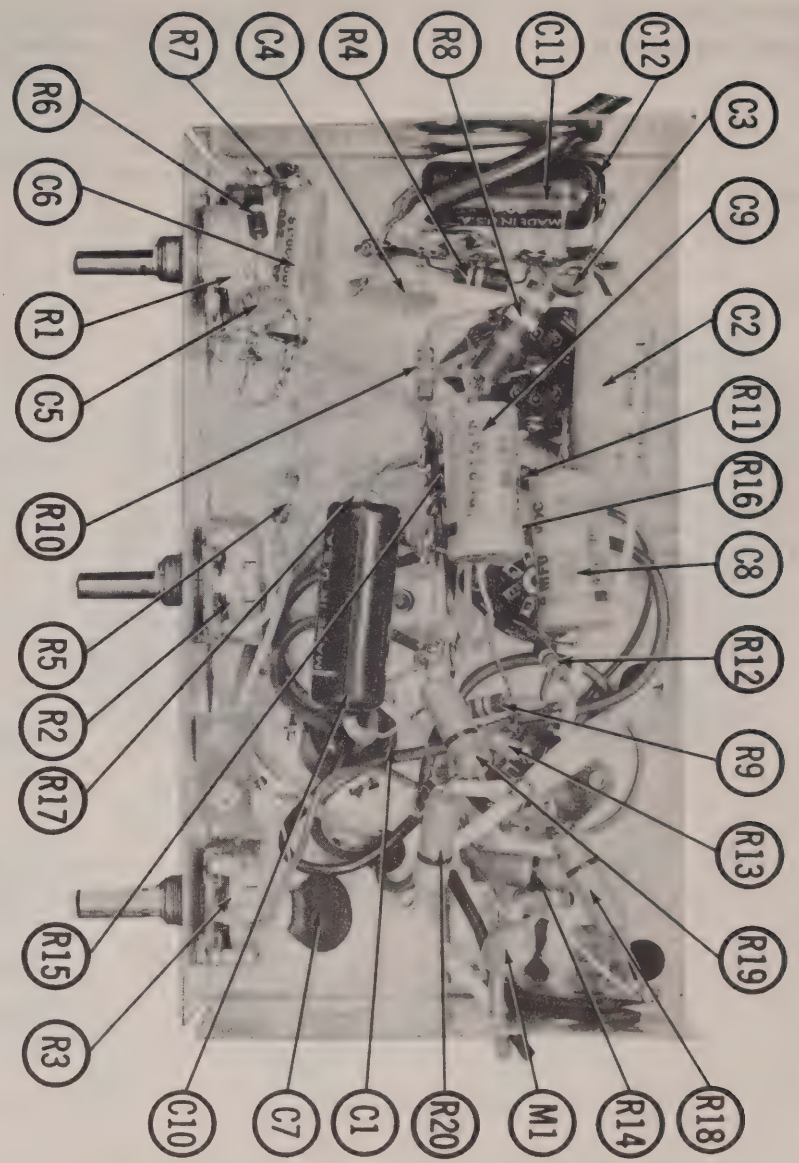
CABINETS & CABINET PARTS

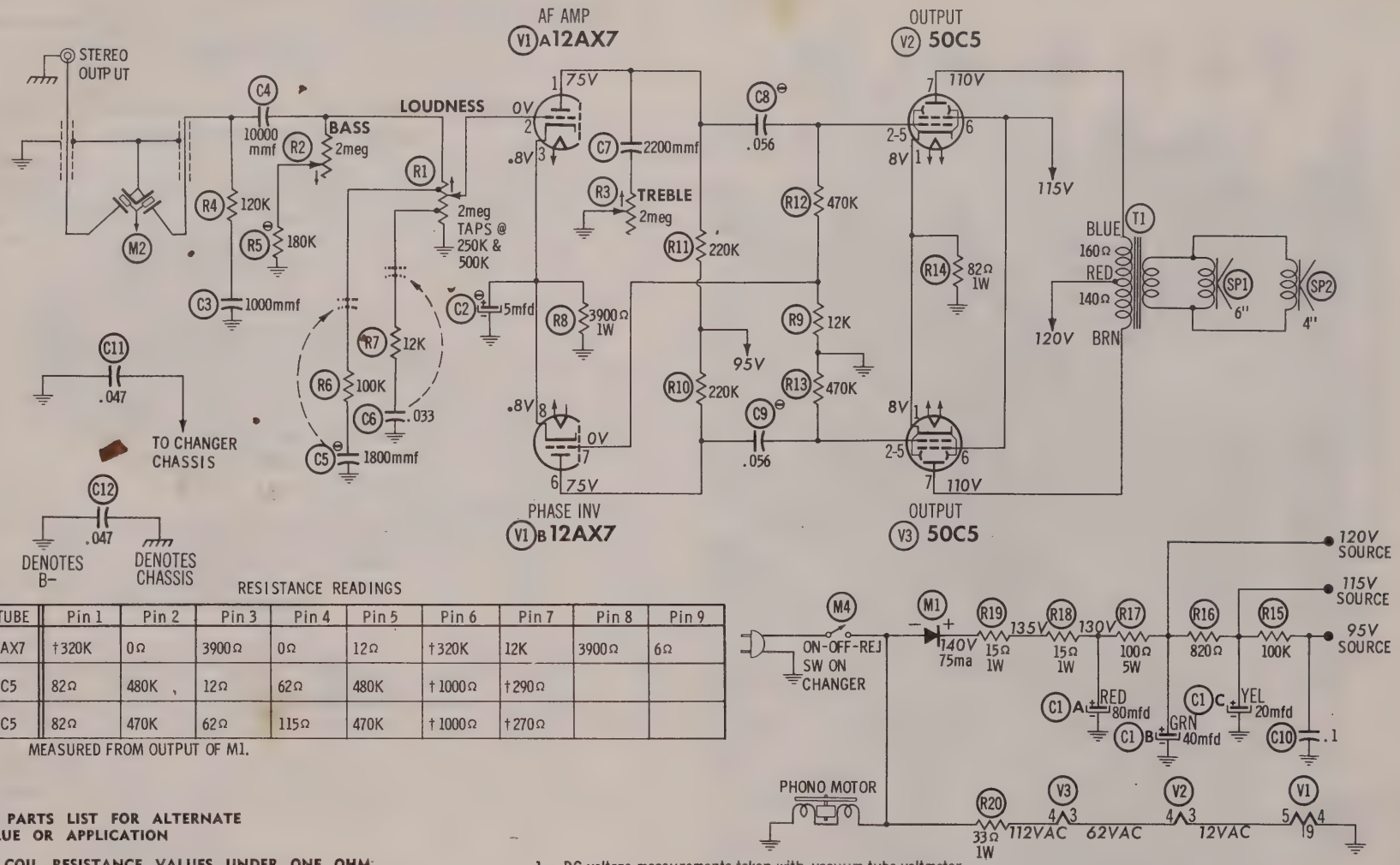
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS BOTTOM VIEW





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†320K	0Ω	3900Ω	0Ω	12Ω	†320K	12K	3900Ω	6Ω
V2	50C5	82Ω	480K	12Ω	62Ω	480K	†1000Ω	†290Ω		
V3	50C5	82Ω	470K	62Ω	115Ω	470K	†1000Ω	†270Ω		

† MEASURED FROM OUTPUT OF M1.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

SYLVANIA MODEL 4419 (Ch. 1-642-1)

PHOTOFACT* Folder with CIRCUITRACE*

TRANCEL MODEL T-7

TRANCEL
MODEL T-7

TRADE NAME	Trancel Model T-7
IMPORTER	Excel Corp. of America, 9 Rockefeller Plaza, New York 20, N. Y.
TYPE SET	Battery Operated Portable Transistorized AM Receiver
POWER SUPPLY	9 Volts DC
TUNING RANGE—BROADCAST	530KC-1650KC
RATING	6MA@9 Volts DC (No Signal, Min. Volume) 7MA@9 Volts DC (Signal, Normal Volume)

TRANCEL
MODEL T-7

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:
A1, A2, A3, A4..... GENERAL CEMENT #9087, 9089
WALSCO #2528
A5, A6..... GENERAL CEMENT #5000, 5003, 8276, 8290
WALSCO #2512, 2525

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400∿ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	530KC	Tuning gang fully closed	"	A4	"
3.		"	1650KC	Tuning gang fully open	"	A5	Adjust for maximum output. Repeat steps 2 & 3.
4.		"	1400KC	1400KC	"	A6	Adjust for maximum output.

DISASSEMBLY

1. Remove tuning knob by pulling off.
2. Remove rear cover.
3. Remove 3 screws holding board to cover.

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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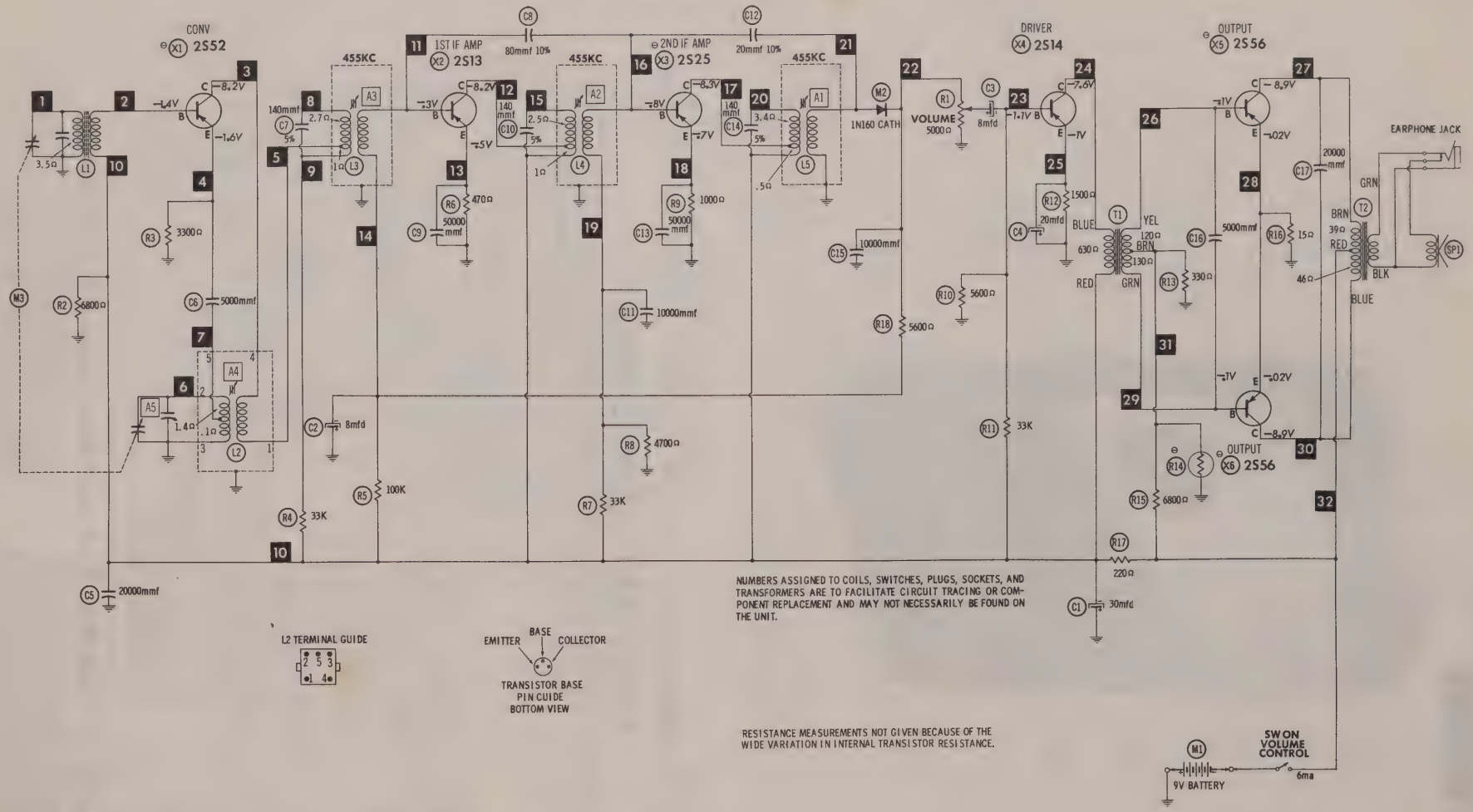
JF117

SET 460 FOLDER 22



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE®

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TRANCEL MODEL T-7

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2S52 *	Converter		2N140	2N486	2N140	PNP
X2	2S13	1st IF Amplifier		2N139	2N483	2N139	PNP
X3	2S25 †	2nd IF Amplifier		2N139	2N482	2N139	PNP
X4	2S14	Driver		2N109	2N362	2N109	PNP
X5	2S56 ♦	Output		2N109	2N632	2N109	PNP Matched
X6	2S56 ♦	Output		2N109	2N632	2N109	PNP

* Alternate type 2S12
† Alternate type 2S13
♦ Alternate type 2S15

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	TRANCEL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	30	10	30384	XPP-10030	NLW30-15	TT15X30	ML30-15	TE-1158	
C2	8	3	30226	XPP-3008	NLW8-6	TT6X8	ML8-6	TE-1052.5	
C3	8	3	30226	XPP-3008	NLW8-6	TT6X8	ML8-6	TE-1052.5	
C4	20	3	30366	XPP-3020	NLW20-6	TT3X25	ML20-6	TE-1054	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	TRANCEL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	20000			30212	C-80V203AM	DD-203	H-05S2	TA-120	TG-S20	
C6	5000			30210	C-80V502AM	DM-502	H-05D5	TA-250	TG-D50	
C7	140		5%	30383					5GA-T14S10%*	
C8	80		10%	30363	1469-00008	TCZ-82	22R5Q82	CNO-482	MS-482	
C9	50000			30213	C-80V503AM	DDA-503	H-05S5	TA-150	TG-S50	
C10	140		5%	30383					5GA-T14S 10%*	
C11	10000			30211	C-80V103AM	DM-103	H-05S1	TA-110	TG-S10	
C12	20		10%	30362	1469-00002	TCZ-20	22R5Q2	CNO-422	MS-42	
C13	50000			30213	C-80V503AM	DDA-503	H-05S5	TA-150	TG-S50	
C14	140		5%	30383					5GA-T14S 10%*	
C15	10000			30211	C-80V103AM	DM-103	H-05S1	TA-110	TG-S10	
C16	5000			30210	C-80V502AM	DM-502	H-05D5	TA-250	TG-D50	
C17	20000			30212	C-80V203AM	DD-203	H-05S2	TA-120	TG-S20	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	TRANCEL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/4	40266	B16-214				Volume & switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		TRANCEL PART No.	NOTES
	OHMS	WATT		
R2	6800Ω		40539	
R3	3300Ω		40214	
R4	33K		40546	
R5	100K		40221	
R6	470Ω		40210	
R7	33K		40546	
R8	4700Ω		40537	
R9	1000Ω		40211	
R10	5600Ω		40538	

ITEM No.	RATING		TRANCEL PART No.	NOTES
	OHMS	WATT		
R11	33K		40546	
R12	1500Ω		40212	
R13	330Ω		40526	
R14			40250	Note 1
R15	6800Ω		40539	
R16	15Ω		40512	
R17	220Ω		40208	
R18	5600Ω		40538	

Note 1. Temperature compensating

PRINTED BOARD

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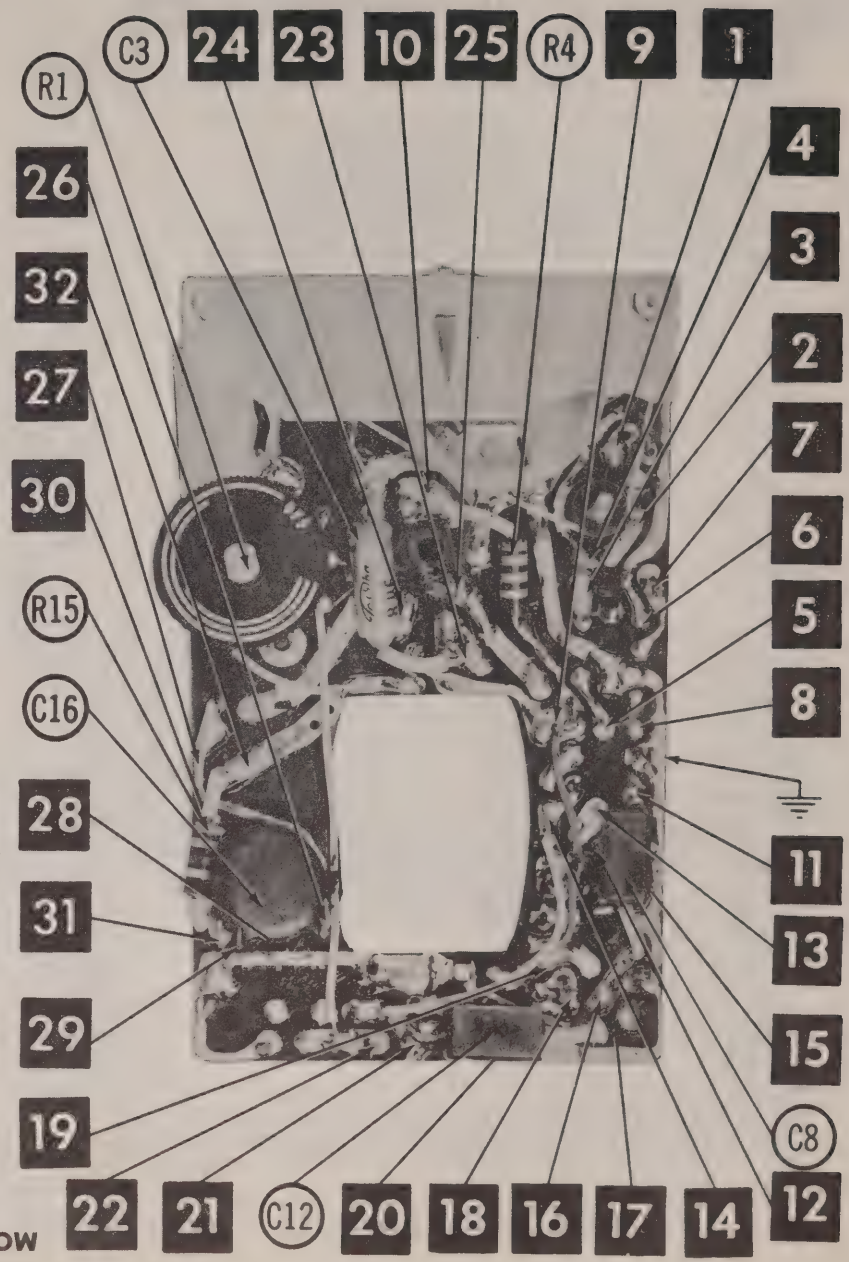


TRANCEL MODEL T-7

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		TRANCEL PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	20191						
L2	Osc. Coil	20225						
L3	1st IF Trans.	20222						
L4	2nd IF Trans.	20223						
L5	3rd IF Trans.	20224						

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	TRANCEL PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1.7:	1	20221						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	TRANCEL PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	2500Ω CT	6-8Ω	20220							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	TRANCEL PART No.	QUAM PART No.	
SP1	2 1/4"	PM	8-10Ω	50083	22A06	

BATTERIES

ITEM No.	VOLTAGE	TRANCEL PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V			2U6		216		M-1604 TR-146R①	① Mercury Type

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		TRANCEL PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N60	1N60	1N60	1N60	1N60	Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	TRANCEL PART No.	NOTES
M3	Tuning Cap Earphone	30382 ER-1401	2 Gang

CABINETS & CABINET PARTS

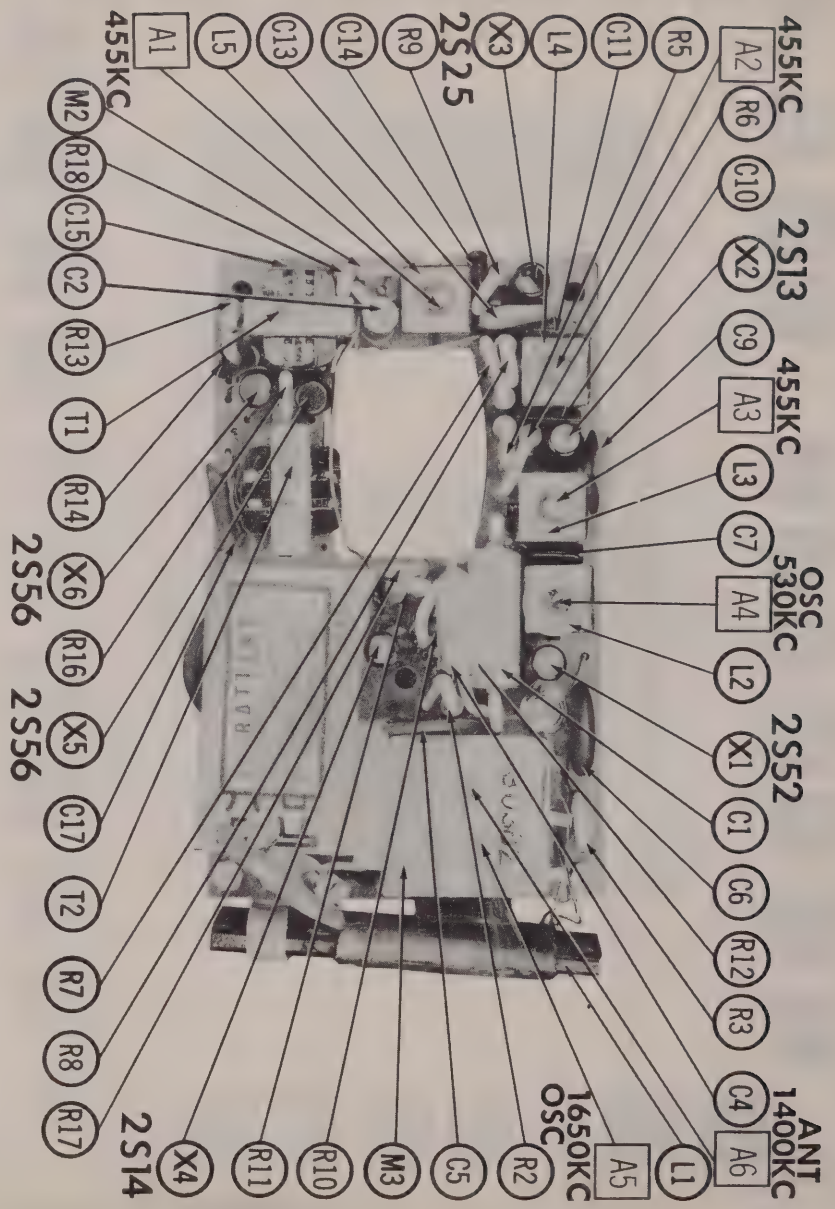
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	91227	Tuning
Knob	91221	Volume-On-Off
Cabinet Assembly	91242	
Leather Case	91241	
Pointer	80627	

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—TOP VIEW

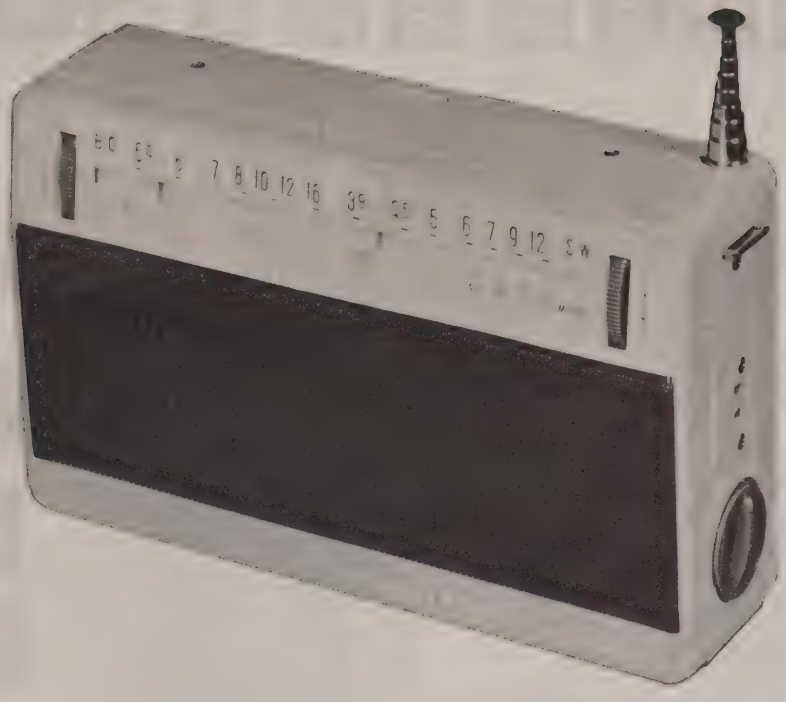


PHOTOFACT* Folder with CIRCUITRACE*

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

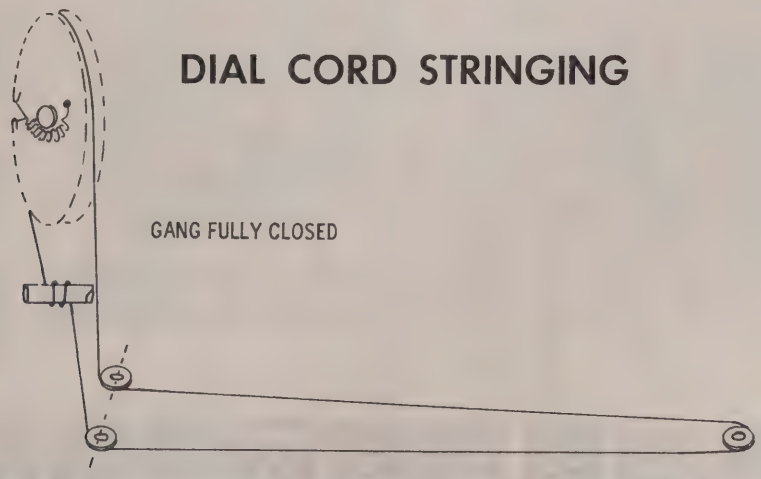
TRUETONE MODEL DC3050

TRUETONE MODEL DC3050



TRUETONE MODEL DC3050

TRADE NAME	Truetone Model DC 3050		
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City 8, Missouri		
TYPE SET	Battery Operated Portable Transistorized BC-SW Receiver		
POWER SUPPLY	9 Volts DC	RATING	8.5MA@9 Volts DC (No Signal, Min. Volume) 10.5MA@9 Volts DC (Signal, Normal Volume)
TUNING RANGE—BROADCAST	535 – 1640KC	SHORT WAVE	3.9 - 12MC



DIAL CORD STRINGING

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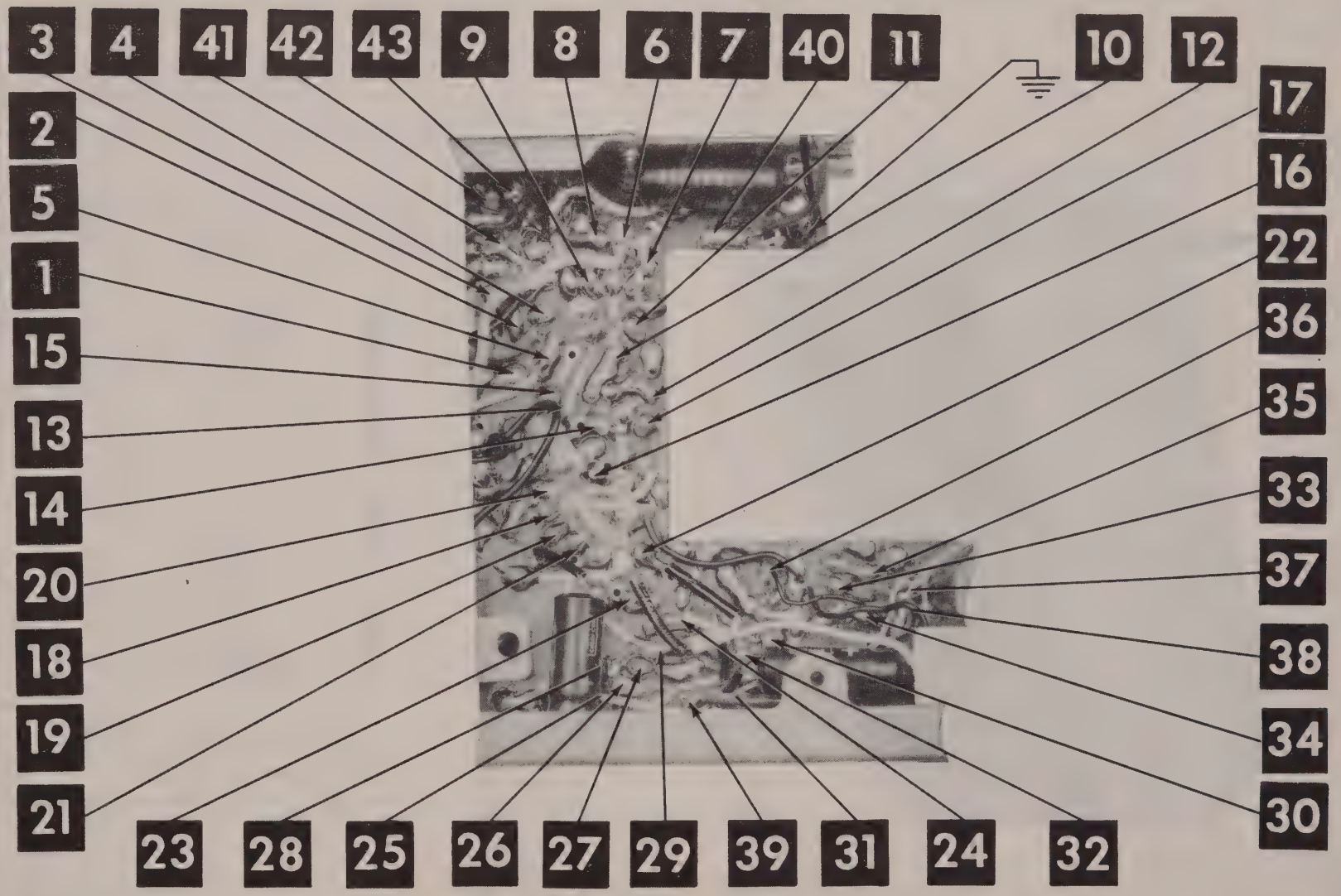
JF338



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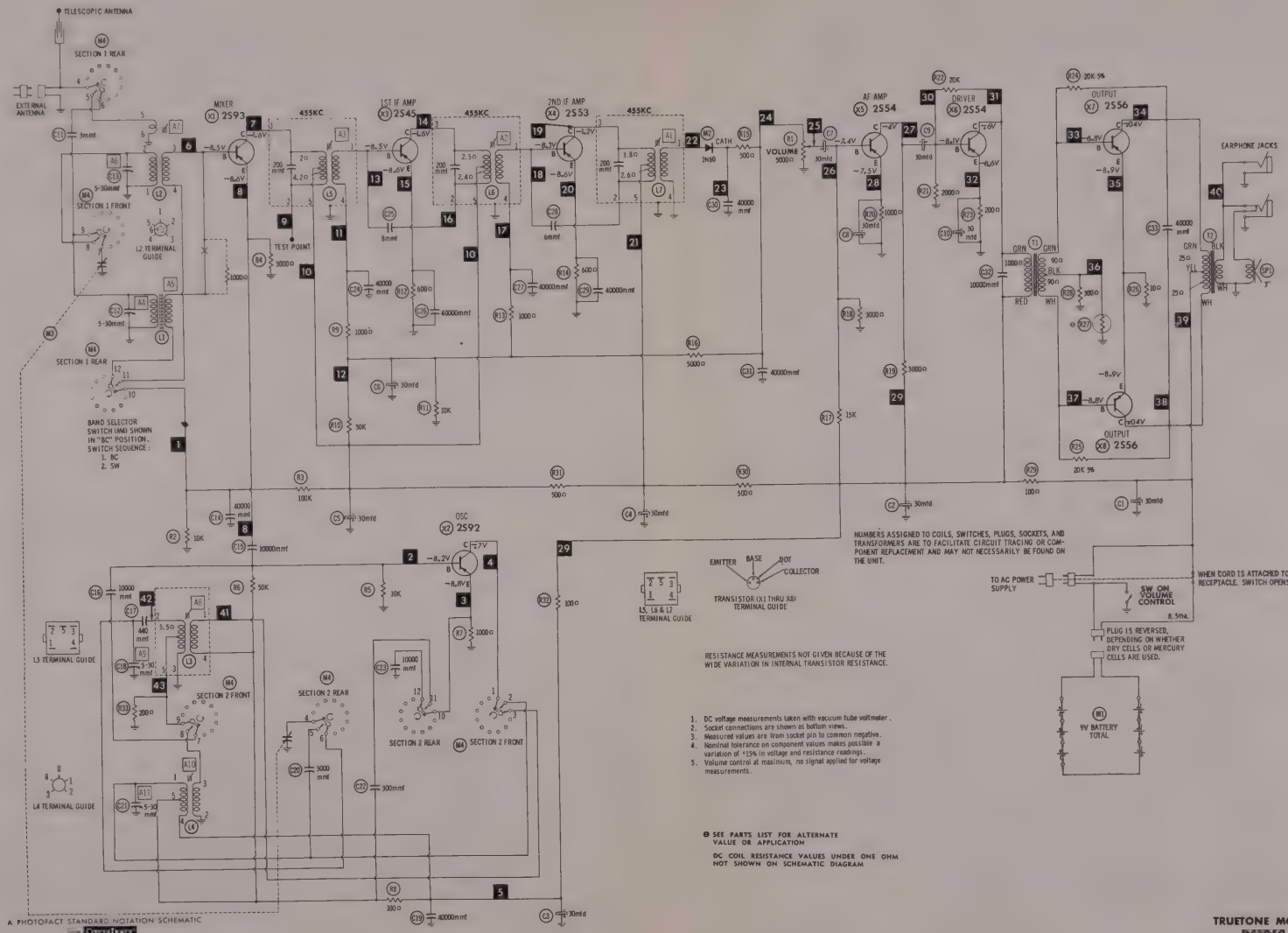
PRINTED BOARD


TELESCOPIC ANTENNA
EXTERNAL ANTENNA
SECTION 1 REAR
SECTION 1 FRONT
L2 TERMINAL GUIDE
BAND SELECTOR SWITCH (NO) SHOWN IN "BC" POSITION. SWITCH SEQUENCE: 1. BC 2. SW
MIXER X1 2S93
1ST IF AMP X3 2S45
2ND IF AMP X4 2S53
455KC
TEST POINT
OSC X2 2S92
AF AMP X5 2S54
DRIVER X6 2S54
OUTPUT X7 2S56
OUTPUT X8 2S56
VOLUME 5000Ω
EARPHONE JACKS
L3 TERMINAL GUIDE
L4 TERMINAL GUIDE
L5, L6 & L7 TERMINAL GUIDE
TRANSISTOR (X1 THRU X8) TERMINAL GUIDE
EMITTER
BASE
DOT
COLLECTOR
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.
TO AC POWER SUPPLY
SW ON VOLUME CONTROL
WHEN CORD IS ATTACHED TO RECEPTACLE, SWITCH OPENS.
8.5ma.
PLUG IS REVERSED, DEPENDING ON WHETHER DRY CELLS OR MERCURY CELLS ARE USED.
M1 9V BATTERY TOTAL
RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.
1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.
❶ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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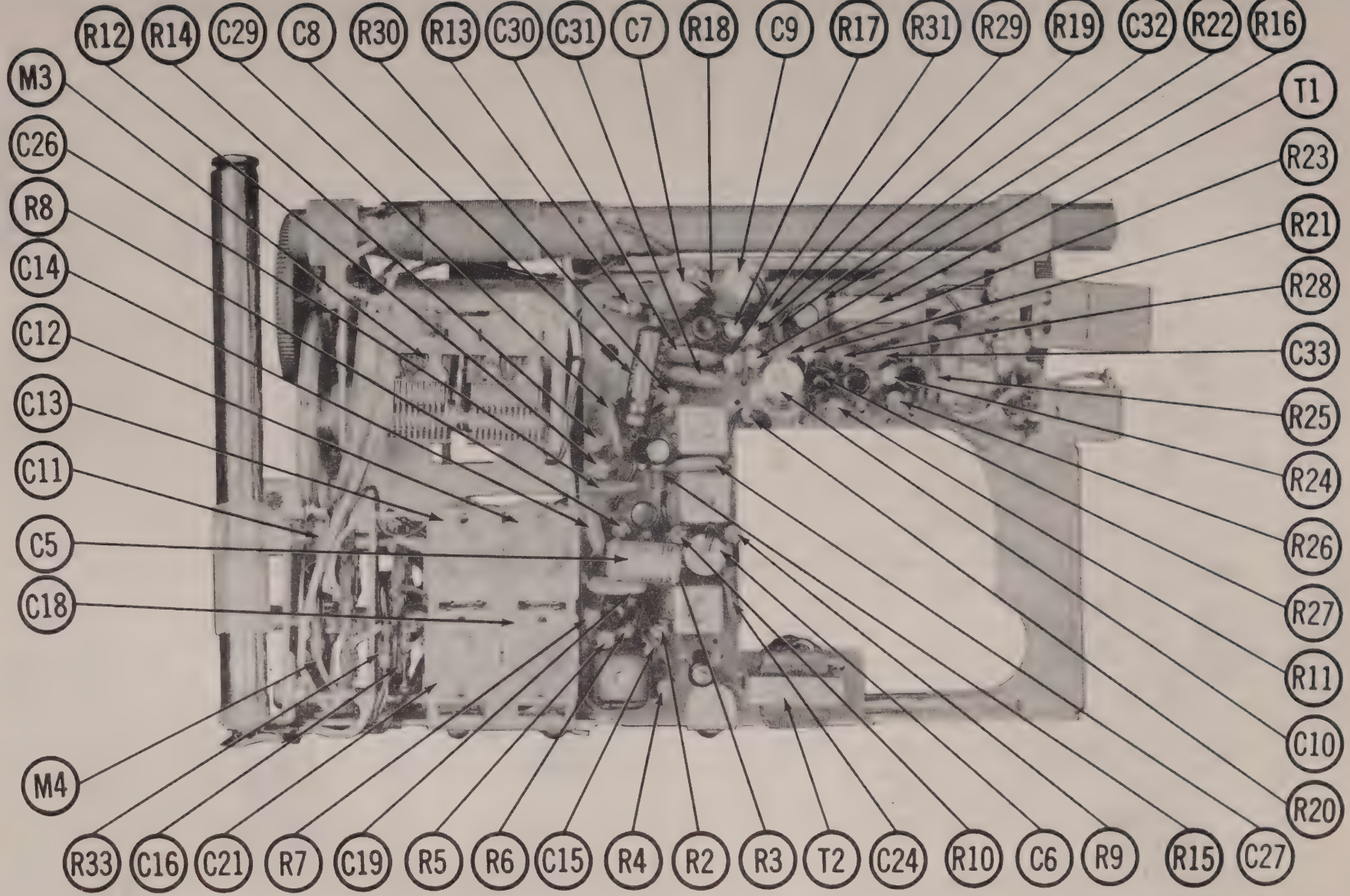
TRUETONE MODEL 5C3050



CHASSIS-TOP VIEW

DC3050

TRUETONE MODEL

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

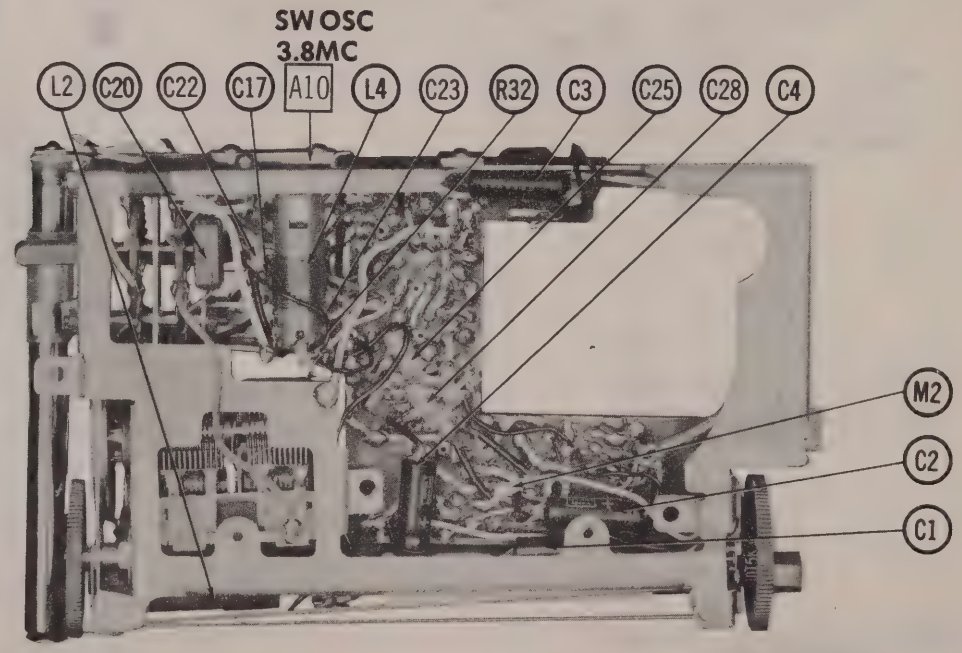
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested alignment tools:
- A1, A2, A3..... GENERAL CEMENT #8607, 9291
  WALSCO #2520, 2522, 2523, 2524, 2537
- A4, A6, A9, A11..... GENERAL CEMENT #5004, 5008, 5009
  WALSCO #2520
- A7, A10..... GENERAL CEMENT #8721, 8722
  WALSCO #2519
- A8..... GENERAL CEMENT #8282, 8606, 8606L, 9091
  WALSCO #2526, 2541, 2543, 2544

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400∿ Mod.)	B.C.	Tuning gang fully open	Across voice coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1400KC	"	1400KC	"	A4	"
3.		"	600KC	"	600KC	"	A5	Check alignment of loop stick by use of tuning wand. If necessary, adjust by sliding bobbin along core for maximum output. If large change was necessary, repeat steps 2 and 3.
4.	300Ω Carbon Resistor	High side thru 300Ω to telescope antenna. Low side to B-.	10MC	S.W.	10MC	"	A6	Adjust for maximum output.
5.	"	"	4.5MC	"	4.5MC	"	A7	Adjust for maximum output. If large change was necessary, repeat steps 4 and 5.

Steps 6 thru 9 are not necessary unless the oscillator core has been tampered with or associated components have been replaced.

6.		Loop	535KC	B.C.	Tuning gang fully closed	Across voice coil	A8	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
7.		"	1640KC	"	Tuning gang fully open	"	A9	Adjust for maximum output. Repeat Steps 6 and 7 until oscillator covers required range. Repeat Steps 2 and 3.
8.	300Ω Carbon Resistors	High side thru 300Ω to telescope antenna. Low side to B-.	3.8MC	S.W.	Tuning gang fully closed.	"	A10	Adjust for maximum output.
9.	"	"	12.2MC	"	Tuning gang fully open.	"	A11	Adjust for maximum output. Repeat steps 8 and 9 until oscillator covers required range. Repeat Steps 4 and 5.



CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2S93	Mixer			2N486	2N140	PNP
X2	2S92	Oscillator			2N485	2N411	PNP
X3	2S45	1st IF Amplifier			2N483	2N409	PNP
X4	2S53	2nd IF Amplifier			2N483	2N409	PNP
X5	2S54	AF Amplifier			2N362	2N407	PNP
X6	2S54	Driver			2N362	2N407	PNP
X7	2S56	Output			2N632	2N407	PNP } Matched
X8	2S56	Output			2N632	2N407	PNP } Pair

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	TRUETONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1	30	10		XPP-10030	NLW30-15	TT15X30	ML30-15	TE-1158	
C2	30	10		XPP-10030	NLW30-15	TT15X30	ML30-15	TE-1158	
C3	30	10		XPP-10030	NLW30-15	TT15X30	ML30-15	TE-1158	
C4	30	10		XPP-10030	NLW30-15	TT15X30	ML30-15	TE-1158	
C5	30	6		XPP-6030	NLW30-6	TT6X30	ML30-6	TE-1092	
C6	30	6		XPP-6030	NLW30-6	TT6X30	ML30-6	TE-1092	
C7	30	6		XPP-6030	NLW30-6	TT6X30	ML30-6	TE-1092	
C8	30	6		XPP-6030	NLW30-6	TT6X30	ML30-6	TE-1092	
C9	30	6		XPP-6030	NLW30-6	TT6X30	ML30-6	TE-1092	
C10	30	6		XPP-6030	NLW30-6	TT6X30	ML30-6	TE-1092	

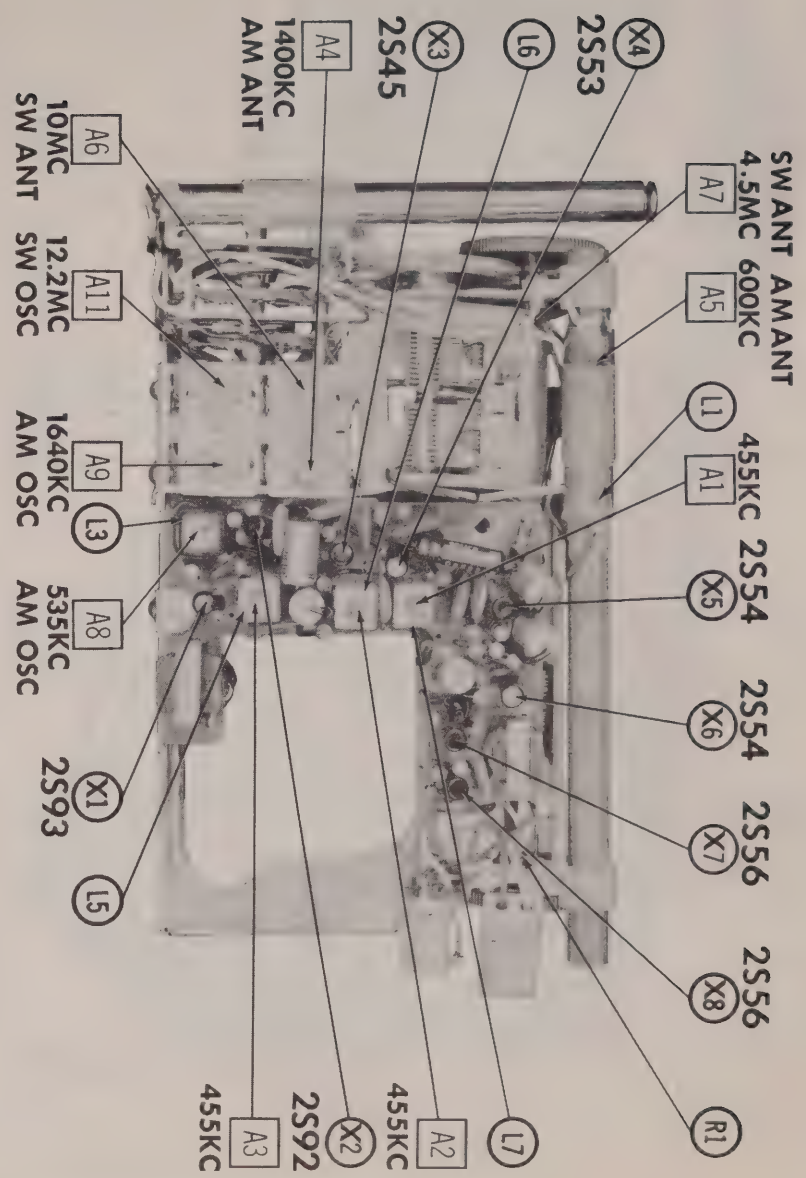
FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	TRUETONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C11	3				NPO-SI 3	D6-030	C10V3C	ZT-553	5TCCB-V3	
C12	5-30			ST-B						
C13	5-30			ST-B						
C14	40000				C-80V503AM	DA-503	H-05S5	TA-150	TG-S50	
C15	10000				C-80V103AM	DM-103	H-05S1	TA-110	TG-S10	
C16	10000				C-80V103AM	DM-103	H-05S1	TA-110	TG-S10	
C17	440								5GA-T44S *	
C18	5-30			ST-B						
C19	40000				C-80V503AM	DA-503	H-05S5	TA-150	TG-S50	
C20	3000				1467-003		1W5D3	UC-523	MS-23	
C21	5-30			ST-B						
C22	300				SI 300	D6-301	L10T3	UC-533	5GA-T3	
C23	10000				C-80V103AM	DM-103	H-05S1	TA-110	TG-S10	
C24	40000				C-80V503AM	DA-503	H-05S5	TA-150	TG-S50	
C25	8					DD-080	L10V8		5GA-V8	
C26	40000				C-80V503AM	DA-503	H-05S5	TA-150	TG-S50	
C27	40000				C-80V503AM	DA-503	H-05S5	TA-150	TG-S50	
C28	6					DD-060	C10V6C		5GA-V6	
C29	40000				C-80V503AM	DA-503	H-05S5	TA-150	TG-S50	
C30	40000				C-80V503AM	DA-503	H-05S5	TA-150	TG-S50	
C31	40000				C-80V503AM	DA-503	H-05S5	TA-150	TG-S50	
C32	10000				C-80V103AM	DM-103	H-05S1	TA-110	TG-S10	
C33	40000				C-80V503AM	DA-503	H-05S5	TA-150	TG-S50	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	TRUETONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/4	V-153	B16-214				Volume & Switch

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	TRUETONE PART No.	QUAM PART No.	
SP1	3"	PM	10Ω	PM-301A		

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R2	10K	
R3	100K	
R4	3000Ω	
R5	10K	
R6	50K	
R7	1000Ω	
R8	100Ω	
R9	1000Ω	
R10	50K	
R11	10K	
R12	600Ω	

ITEM No.	RATING	REMARKS
R13	1000Ω	
R14	600Ω	
R15	500Ω	
R16	5000Ω	
R17	15K	
R18	3000Ω	
R19	3000Ω	
R20	1000Ω	
R21	2000Ω	
R22	20K	
R23	200Ω	

ITEM No.	RATING	REMARKS
R24	20K 5%	
R25	20K 5%	
R26	10Ω	
R27	Temp. Comp.	(#M8601)
R28	300Ω	
R29	100Ω	
R30	500Ω	
R31	500Ω	
R32	100Ω	
R33	200Ω	

BATTERIES

ITEM No.	VOLTAGE	TRUETONE PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V	3B6710 ① 3B6810 ②		Z ①		915 ① E9E②		M15F① M15R②	① 6 Required ② Mercury Type, 6 Required

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		TRUETONE PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M2	1N60		1N60	1N60	1N60	Detector (Pigtail)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		TRUETONE PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	L-198A						
L2	SW Ant. Coil	L-199A						
L3	AM Osc. Coil	L-198B						
L4	SW Osc. Coil	L-199B						
L5	1st IF Trans.	IF-500						
L6	2nd IF Trans.	IF-501						
L7	3rd IF Trans.	IF-502						

MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
M3	Tuning Cap.	C-127	2 Gang (AM. 11– 506mmf, Osc. 11–454mmf)
M4	Switch	WY23-4	Band Selector

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	TRUETONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.5	1	T-453						

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	1087-04	Tuning
Knob	1087-05	Volume
Knob	1123-04	Band Selector
Cabinet	1123-01	
Cabinet	1123-02	Rear Cover

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	TRUETONE PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	800Ω CT	10Ω	T-455	TR-104			TA-43	TR-104		

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

PHOTOFACT* Folder with CIRCUITRACE*

EIA

WESTINGHOUSE MODELS H-685P8, H-686P8 (Ch. V-2396-1)

WESTINGHOUSE MODELS H-685P8, H-686P8 (Ch. V-2396-1)

MODEL H-685P8

WESTINGHOUSE MODELS H-685P8, H-686P8 (Ch. V-2396-1)

TRADE NAME	Westinghouse Models H-685P8, H-686P8 (Ch. V-2396-1)
MANUFACTURER	Westinghouse Electric Corp., TV-Radio Div., Metuchen, N.J.
TYPE SET	Battery Operated Transistorized AM Receiver With Battery Operated Clock
POWER SUPPLY	Radio: 6 Volts DC Clock: 1.5 Volts DC
RATING	Radio: 10MA @ 6 Volts DC (No Signal, Min. Vol.) 14MA @ 6 Volts DC (Signal, Normal Vol.) Clock: 1MA @ 1.5 Volts DC
TUNING RANGE—BROADCAST	540-1625KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

Suggested Alignment Tools:
A1, A2, A3 .... GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8987
WALSCO #2531
A4. A5 ..... GENERAL CEMENT #5004, 5008, 5009
WALSCO #2520
A6 ..... GENERAL CEMENT #8606, 8606L, 8282, 9295
WALSCO #2526, 2543, 2544, 2545

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400~ Mod)	Tuning gang fully closed	Across voice coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1625KC	Tuning gang fully open	"	A4	"
3.		"	1400KC	1400KC	"	A5	"
4.		"	600KC	600KC	"	A6	"

HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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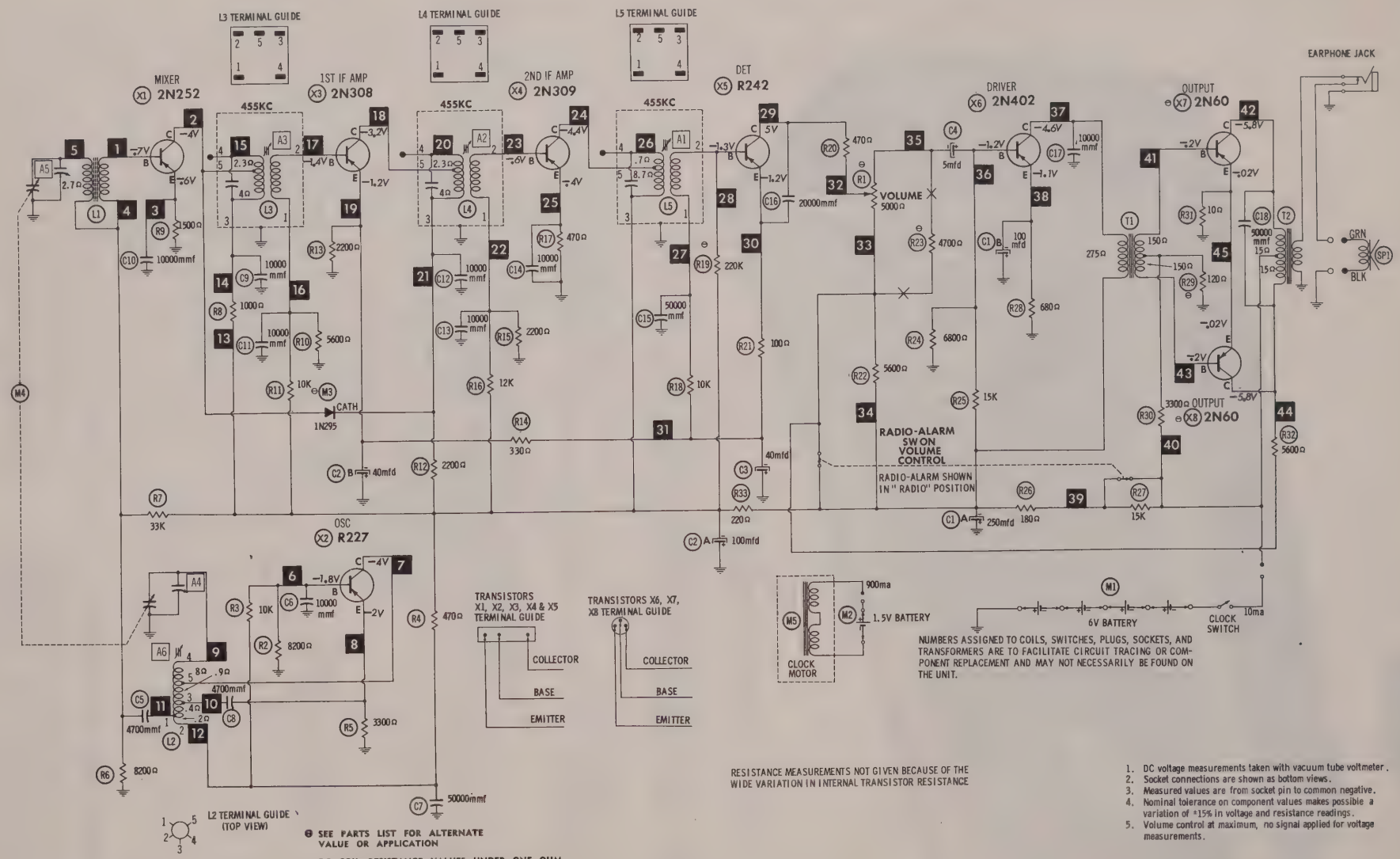
JG188

SET 460 FOLDER 24



NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COMPONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON THE UNIT.

RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC with CIRCUITRACE

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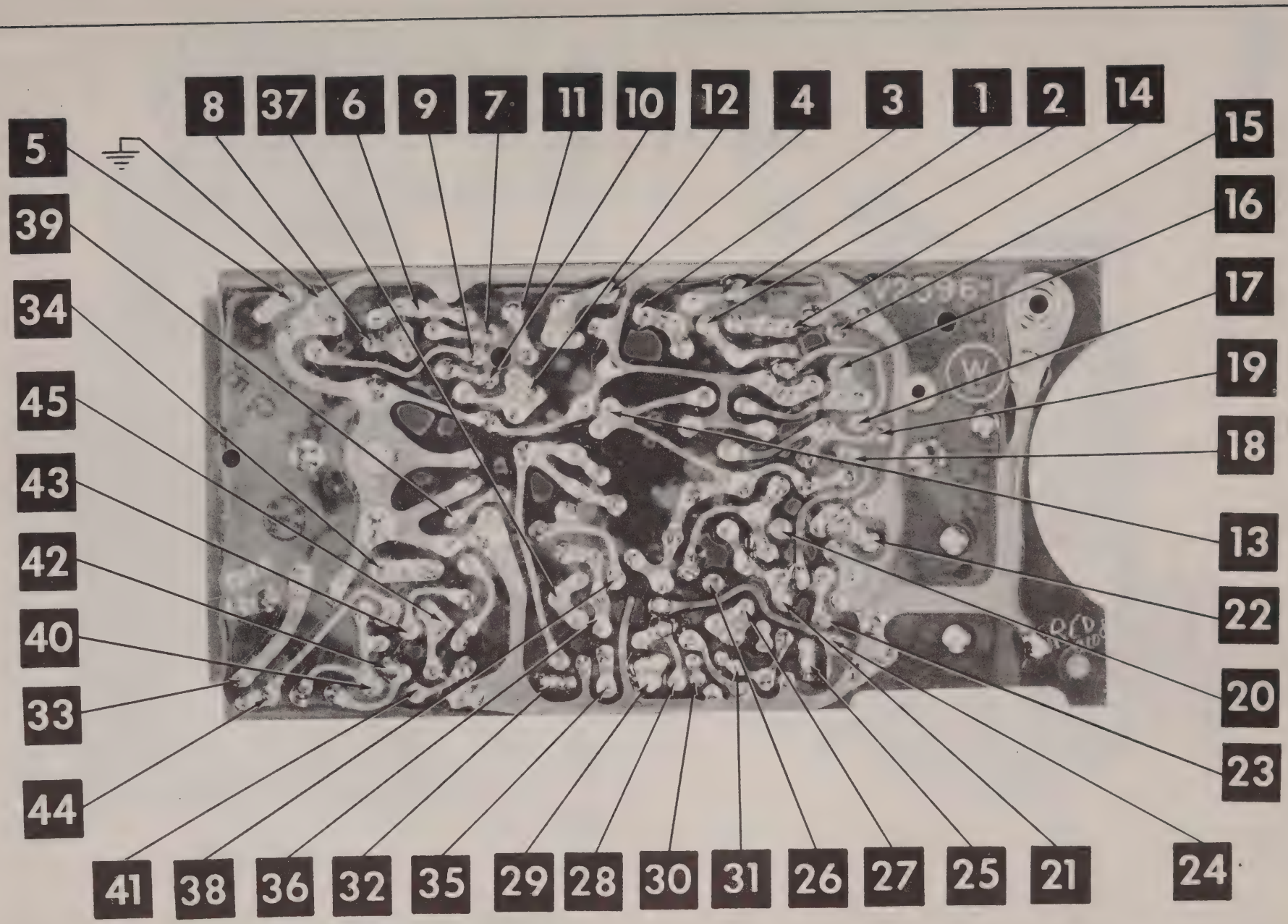
WESTINGHOUSE MODELS H-685P8, H-686P8 (Ch. V-2396-1)



A Howard W. Sams CIRCUITRACE® Photo

PRINTED BOARD

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N252	Mixer			2N486	2N140	PNP
X2	R227	Oscillator			2N485		PNP
X3	2N308	1st IF Amp.			2N483	2N247	PNP
X4	2N309	2nd IF Amp.			2N482	2N247	PNP
X5	R242	Detector			2N482		PNP
X6	2N402	Driver			2N362		PNP
X7	2N60 *	Output			2N362		PNP } Matched
X8	2N60 *	Output			2N362		PNP } Matched

* Alternate Types 2N61, 0060, 0061.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	Westinghouse PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	
C1A	250	7	218V025H28			PETA2300		VLS-2170	
B	100	3							
C2A	100	6	218V025H29	BCD6X10030		PTE2290		VLS-2125 *	
B	40	3							
C3	40	3	218V012H02	PWE3040	EC40-3	TT3X40		TE-1057	
C4	5	7	218V012H14	PWF10005	EC5-15	TT12X5	ML5-6	TE-1084	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING			REPLACEMENT DATA						NOTES
	CAP.	VOLT	TOL	Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	4700			215V300H04	BPD-0047	DD-472	BYA10D47M	B-247	5GA-D47	
C6	10000			R2CC63Z5Z103P	BPD-01	DD-103	H-05S1	TA-110	TG-S10	
C7	50000			215V303H03	BPD-05	DF-503	H-05S5	TA-150	TG-S50	
C8	4700			215V300H04	BPD-0047	DD-472	BYA10D47M	B-247	5GA-D47	
C9	10000			R2CC63Z5Z103P	BPD-01	DD-103	H-05S1	TA-110	TG-S10	
C10	10000			R2CC63Z5Z103P	BPD-01	DD-103	H-05S1	TA-110	TG-S10	
C11	10000			R2CC63Z5Z103P	BPD-01	DD-103	H-05S1	TA-110	TG-S10	
C12	10000			R2CC63Z5Z103P	BPD-01	DD-103	H-05S1	TA-110	TG-S10	
C13	10000			R2CC63Z5Z103P	BPD-01	DD-103	H-05S1	TA-110	TG-S10	
C14	10000			R2CC63Z5Z103P	BPD-01	DD-103	H-05S1	TA-110	TG-S10	
C15	50000			215V303H03	BPD-05	DF-503	H-05S5	TA-150	TG-S50	
C16	20000			215V303H04	BPD-02	DD-203	H-05S2	TA-120	TG-S20	
C17	10000			R2CC63Z5Z103P	BPD-01	DD-103	H-05S1	TA-110	TG-S10	
C18	50000			215V303H03	BPD-05		H-05S5	TA-150	TG-S50	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Westinghouse PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	5000Ω	1/4	270V066H01					Volume, Note 1
B	Switch							Radio-Alarm

Note 1. Some versions use 2500Ω (Part #270V066H02).

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		Westinghouse PART No.	NOTES
	OHMS	WATT		
R2	8200Ω		RC20AE822K	
R3	10K		RC20AE103K	
R4	470Ω		250V224A71	
R5	3300Ω		RC20AE332K	
R6	8200Ω		RC20AE822K	
R7	33K		RC20AE333K	
R8	1000Ω		250V221A02	
R9	1500Ω		RC20AE152K	
R10	5600Ω		250V225A62	
R11	10K		RC20AE103K	
R12	2200Ω		RC20AE222K	
R13	2200Ω		RC20AE222K	
R14	330Ω		RC20AE331K	
R15	2200Ω		RC20AE222K	
R16	12K		RC20AE123K	
R17	470Ω		250V224A71	

Note 1. Early versions use a 100K in this application.
Note 2. Not used when R1 is 2500Ω.

ITEM No.	RATING		Westinghouse PART No.	NOTES
	OHMS	WATT		
R18	10K		RC20AE102K	
R19	220K		250V222A24	Note 1
R20	470Ω		RC20AE123K	
R21	100Ω		250V221A01	
R22	5600Ω		250V225A62	
R23	4700Ω			Note 2
R24	6800Ω		RC20AE682J	
R25	15K		RC20AE153J	
R26	180Ω		250V221A81	
R27	15K		RC20AE153J	
R28	680Ω		RC20AE681J	
R29	120Ω		RC20AE121K	Note 3
R30	3300Ω		RC20AE332K	
R31	10Ω		RC20AE100K	
R32	5600Ω		250V225A62	
R33	220Ω		RC20AE221M	

Note 3. Early versions use 100Ω in this application.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		Westinghouse PART No.	Gramer PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loopstick	310V046H01						
L2	Osc. Coil	230V074H01						
L3	1st IF Trans.	235V045H01						
L4	2nd IF Trans.	235V045H01						
L5	3rd IF Trans.	235V041H03						

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1 :	1	430V061H02						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	350Ω CT	3-4Ω	430V073H01	TR22 ①			TA-41 ①	TR22 ①	TY-57X①	① Bend ears under or cut off.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Westinghouse PART No.	QUAM PART No.	
SP1	3"	PM	3-4Ω	570V058H01		

BATTERIES

ITEM No.	VOLTAGE	Westing-house PART No.	REPLACEMENT DATA						NOTES
			BURGESS		EVEREADY		MALLORY		
			"A"	"B"	"A"	"B"	"A"	"B"	
M1	6V			Z ①		1015 ① E9 ② A100		M-15R ① ZM-9 ② M-13R RM-42R ②	① 4 used. ② Mercury Type, 4 used.
M2	1.5V			2R					

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA				NOTES
		Westinghouse PART No.	CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
M3	1N295 *	296V002H01	1N60	1N60	1N295	Over load (Pigtail)

* Some versions may use 1N87G in this application.

MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
M4	Tuning Cap.	330V026H01	2 Gang (Ant. 11-127mmf, Osc. 12-90mmf)
M5	Clock	650V014H01	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob Ass'y.	559V044H01	Tuning, Includes Compression Spring
Knob Ass'y.	550V104H01	Volume-On-Off
Knob Ass'y.	550V107H01	Clock, 2 used
Knob Ass'y.	559V045H01	AM Dial, Includes Compression Spring
Clock Dial	558V195H01	
Cabinet Front	558V199H01	
Cabinet Back	513V037H01	Brown, Model H-685P8
Cabinet Back	513V037H02	Pink, Model H-686P8
Clock Crystal	558V198H01	

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

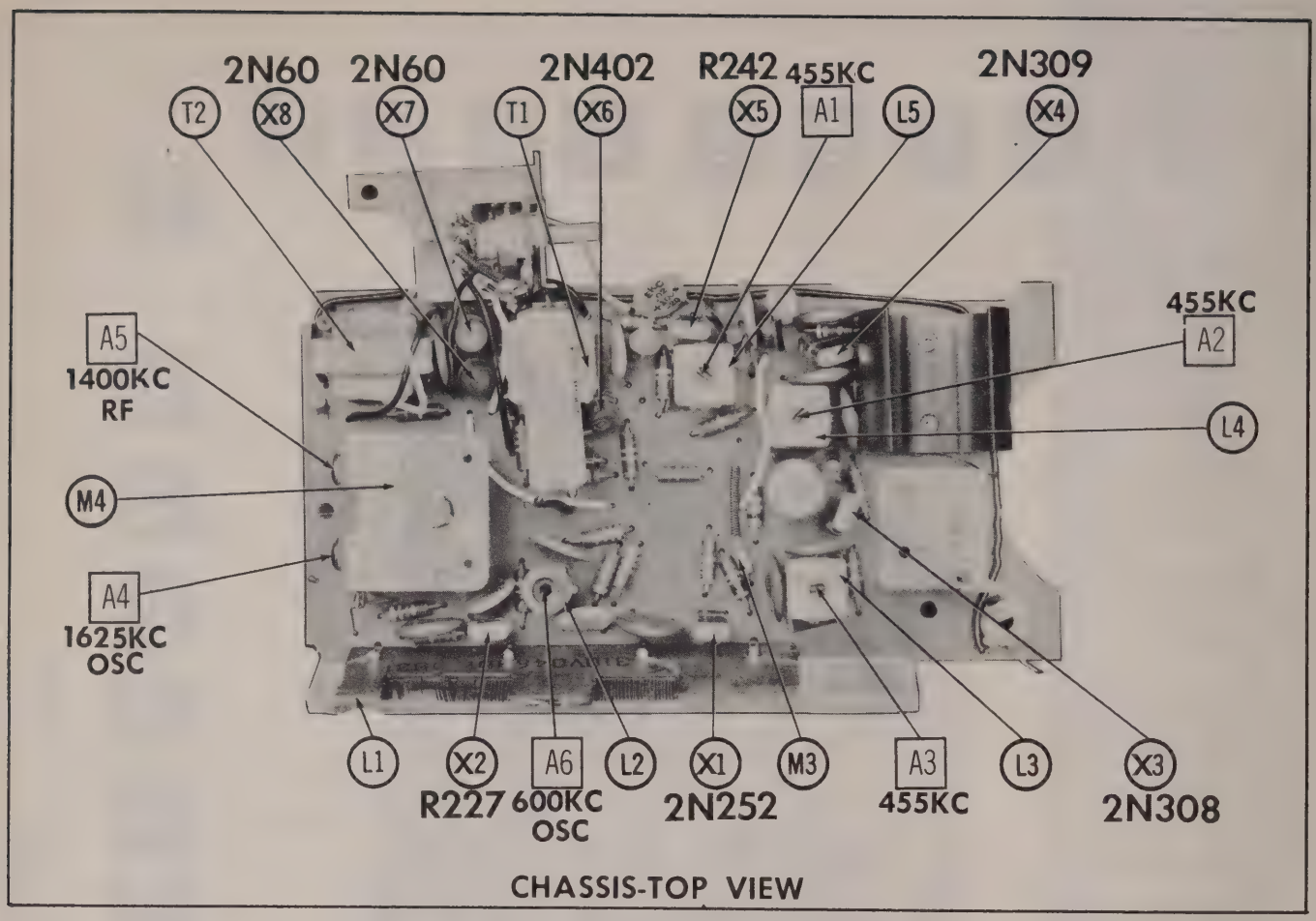
DISASSEMBLY

CHASSIS REMOVAL

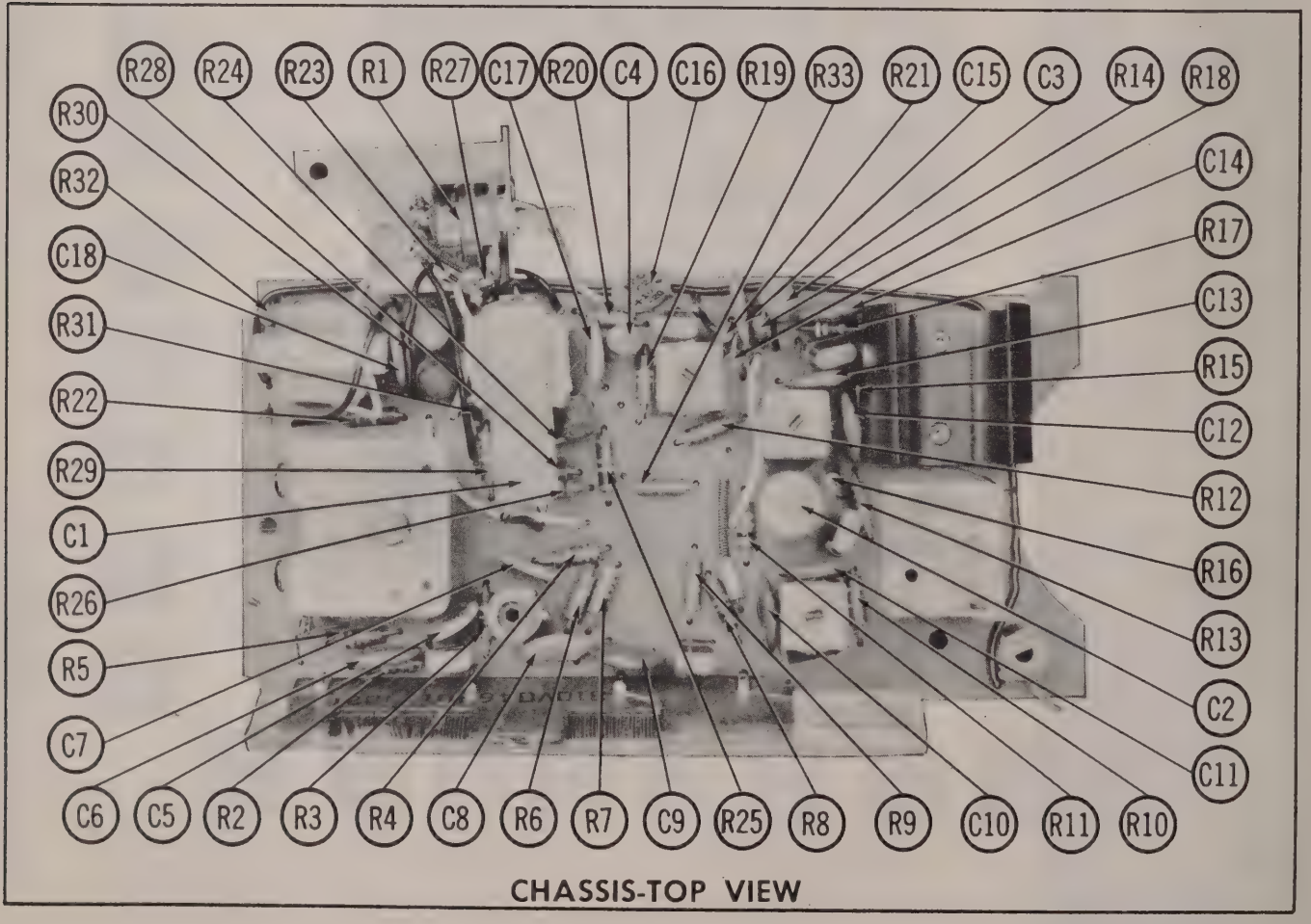
1. Remove screw from center of cabinet back.
2. Remove 2 screws from bottom of cabinet.
3. Separate cabinet front from rear.
4. Remove tuning knob and dial. (Insert a loop of string under dial and pull.)
5. Remove 3 hex head screws holding printed board to cabinet.
6. Unsolder black wire from radio battery holder.
7. Disconnect speaker leads, clock battery lead and the printed board terminal near the output transformer.
8. Remove printed board from cabinet.

CLOCK REMOVAL

1. Remove printed board (see chassis removal).
2. Unsolder 4 leads from underside of clock case.
3. Remove clock knobs.
4. Remove 4 clock mounting nuts. Remove clock.



CHASSIS-TOP VIEW



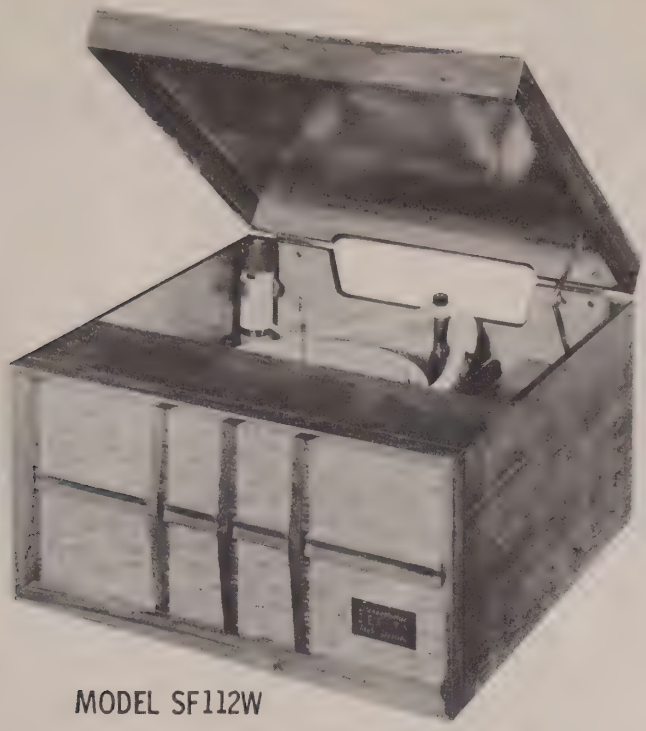
CHASSIS-TOP VIEW

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

ZENITH MODELS SF112E, R, W (Ch. 4B24)

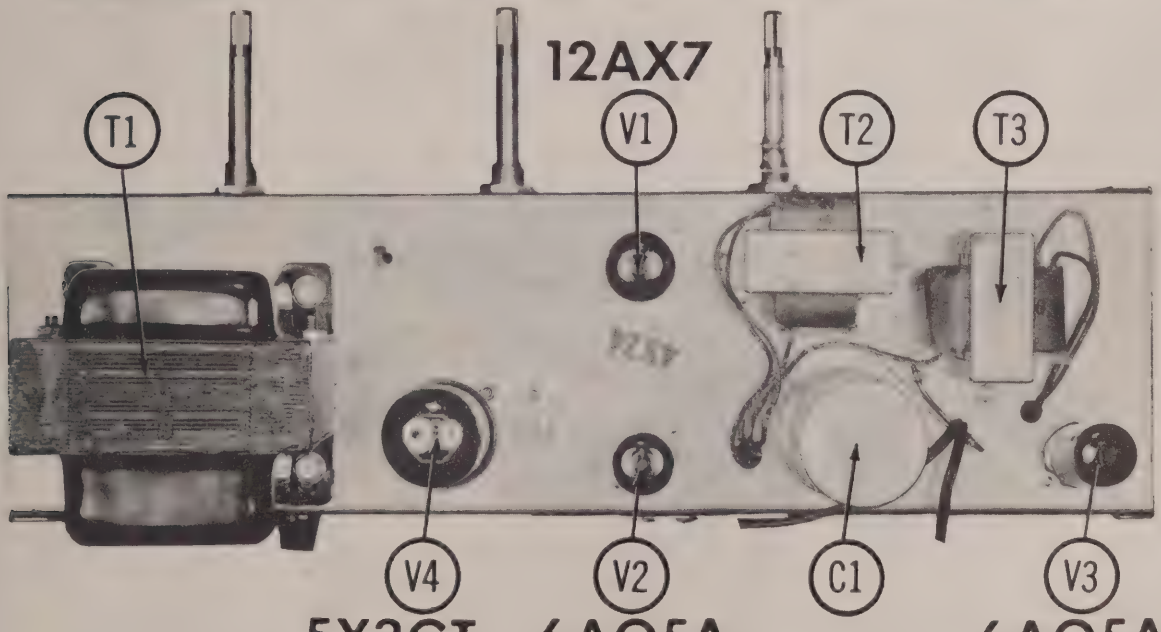
ZENITH MODELS SF112E, R, W (Ch. 4B24)



MODEL SF112W

TRADE NAME	Zenith Models SF112E, SF112R, SF112W (Ch. 4B24)
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois
TYPE SET	AC Operated 4 Tube Stereo Phono Amplifier With 4 Speed Automatic Record Changer
POWER SUPPLY	110 -120 Volts AC, 60 Cycles RATING 47 Watts, .48 Amp. @ 117 Volts AC (Less Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER S-14091 OR 169-106 — SEE SIMILAR ZENITH S-14084 — PHOTOFACT SET 392 FOLDER 14



HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

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JT318

SET 460 FOLDER 25

PARTS LIST AND DESCRIPTIONS

TUBES

◆ CBS ◆ GENERAL ELECTRIC ◆ RAYTHEON ◆ SYLVANIA ◆

ITEM No.	USE	TYPE
V1	Left Channel AF Amp. - Right Channel AF Amp.	12AX7
V2	Left Channel Output	6AQ5A
V3	Right Channel Output	6AQ5A
V4	Rectifier	5Y3GT

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SPRAGUE PART No.	NOTES
C1A	■40	450	22-3046	AFH3-43-50	C0344	FP376.9	TMT-39	TVL-3786	
B	▰40	450							
C	▲20	450							
C2	10	25	22-3076	PRS25V10	BBR10-25	TC22	TD-10-25	TVA-1204	
C3	10	25	22-3076	PRS25V10	BBR10-25	TC22	TD-10-25	TVA-1204	
C4	40	25	22-1156	PRS150V40	BBR50-25	TC48	TD-40-150	TVA-1413	
C5	40	25	22-1156	PRS150V40	BBR50-25	TC48	TD-40-150	TVA-1413	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	RATING TOL	REPLACEMENT DATA ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C6	330		10%	22-2866	1469-00033	MD-331	22R5T33		MS-333	
C7	33		10%	22-2168	NPO-SI 33	D6-330	L10Q33	CNO-433	5GA-Q33S 10%*	
C8	2200		10%	22-18	DI-2200		PM6D22	JL-222	5GA-D22S 10%*	
C9	220		10%	22-2703	DI-220	MD-221	L10T22	JL-322	5GA-T22S 10%*	
C10	.022	200	10%	22-2807	V84C2S22		PM4S22	GTM2122	2TM-S22	
C11	100		10%	22-9	DI-100	MD-101	L10T1	CNO-310	5GA-T1S 10%*	
C12	270		N750 10%	22-3140		TCN-270	C10T27U	CN7-327	5TCU-T27S 10%*	
C13	.047	600		22-2794	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C14	4700			22-14	BPD-0047	DD-472	BYA10D47M	B-247	5GA-D47	
C15	2.2mfd			22-3085	P292ZN-2	UK-225	WMF1W2E		118P20502S2	
C16	330		10%	22-2866	1469-00033	MD-331	22R5T33		MS-333	
C17	33		10%	22-2168	NPO-SI 33	D6-330	L10Q33	CNO-433	5GA-Q33S 10%*	
C18	2200		10%	22-18	DI-2200		PM6D22	JL-222	5GA-D22S 10%*	
C19	220		10%	22-2703	DI-220	MD-221	L10T22	JL-322	5GA-T22S 10%*	
C20	.022	200	10%	22-2807	V84C2S22		PM4S22	GTM2122	2TM-S22	
C21	100		10%	22-9	DI-100	MD-101	L10T1	CNO-310	5GA-T1S 10%*	
C22	270		N750 10%	22-3140		TCN-270	C10T27U	CN7-327	5TCU-T27S 10%*	
C23	.047	600		22-2794	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C24	4700			22-14	BPD-0047	DD-472	BYA10D47M	B-247	5GA-D47	
C25	.01	600		22-2812	P688N-01	DD-103	CUB6S1	GEM-611	6TM-S1	

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA ZENITH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	3meg *	½	63-4451					Loudness, Left Channel
B	3meg *	½						Stereo Balance, Right Channel
R2A	5meg	½	63-4453				UE2501-S	Bass, Left Channel
B	5meg	½					Not Req.	Bass, Right Channel
C	Switch						Not Req.	Push-Pull, Stereo-Monaural
R3A	250K	½	63-4452	B-51	AD47-250K-Z	Q13-130		Treble, Left Channel
B	250K	½		SR-51	Not Req.	M13-130	■ UE1369	Treble, Right Channel
C	Shaft			Not Req.	KSS-3	Not Req.		

* Tap@1meg.

■ "STA LOC" equivalent: FA254A, RU254A, CS3500

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS
R4	2.7meg	
R5	330K	
R6	1.8meg	
R7	220K	
R8	2700Ω	
R9	100K	
R10	10K	
R11	22K	
R12	15K	
R13	180K	

ITEM No.	RATING	REMARKS
R14	1200Ω	
R15	1000Ω	
R16	390K	
R17	330Ω 1W	
R18	330K	
R19	1.8meg	
R20	220K	
R21	2700Ω	
R22	100K	
R23	10K	

ITEM No.	RATING	REMARKS
R24	22K	
R25	15K	
R26	180K	
R27	1200Ω	
R28	1000Ω	
R29	390K	
R30	330Ω 1W	
R31	1000Ω	
R32	5600Ω 1W	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	RATING SEC. 4	RATING SEC. 5	REPLACEMENT DATA ZENITH PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V@ .48A	450 VCT @.065A	5V@ 2A	6.3 VCT @1.2A			95-1653	24R09U①			PC8403①	24R09U①	R-8A①

① Drill New Mounting Holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA ZENITH PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	7000Ω	6-8Ω	95-1652	22S87	A-2900	AU-608	A-3850	22S87	S-51X	
T3	7000Ω	6-8Ω	95-1652	22S87	A-2900	AU-608	A-3850	22S87	S-51X	

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA ZENITH PART No.	QUAM PART No.	NOTES
SP1	8"	PM	6-8Ω	49-877	8A21Z7	① Includes C15
SP2	3½"	PM	12-14Ω	49-881①	3A15T	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA ZENITH PART No. FUSE	ZENITH PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG	1½A 250V	136-36	62-17	31201.5 (3AG 1½A 250V)	342001	AGC 1½	HKP

PARTS LIST AND DESCRIPTIONS (Continued)

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA						REMARKS
	ZENITH PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		JENSEN PART No.	
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE / NEEDLE	
M2	142-92	13-TB*					* Includes needle & Mounting mechanism

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	ZENITH PART No.	JENSEN PART No.	WALCO PART No.	
M3	(78 RPM)	E98 † or E98D ♦	* W-101STS † or * W-102S † or * W-101STD ♦	† Jewel ♦ Diamond * Includes Cartridge
	(LP)	E98X † or E98XD ♦		

CABINETS & CABINET PARTS

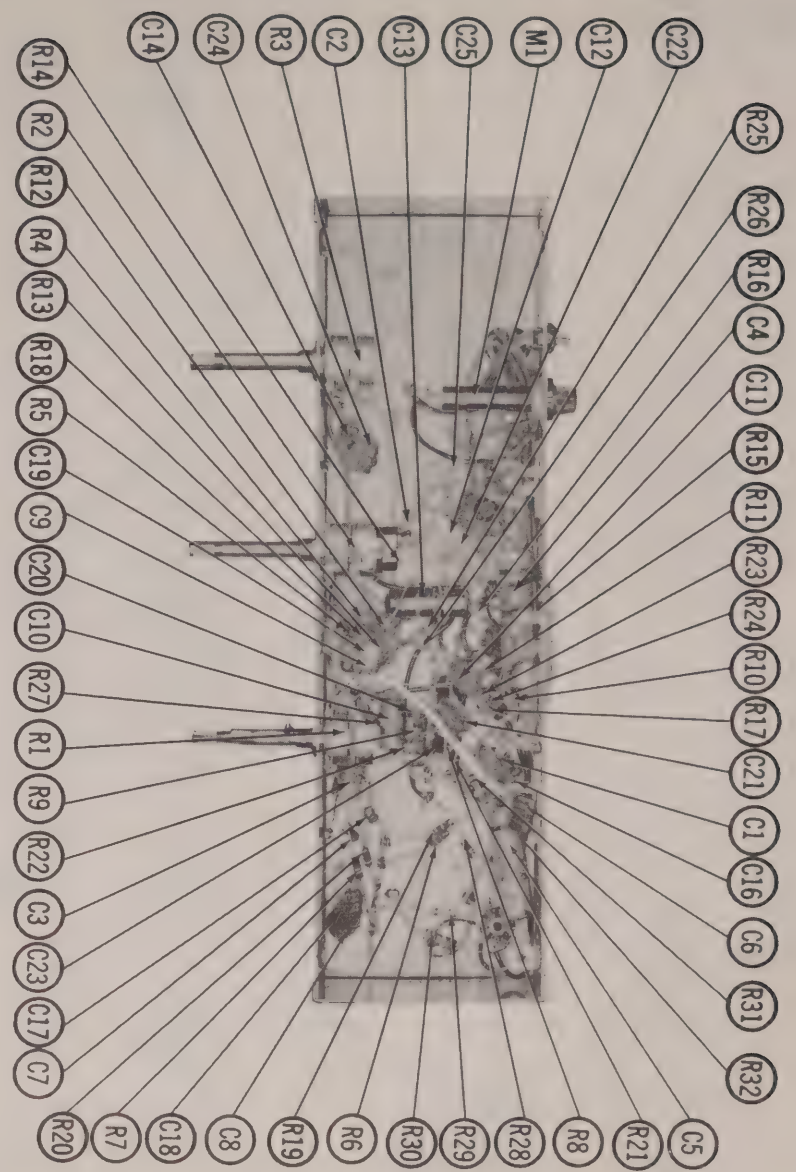
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

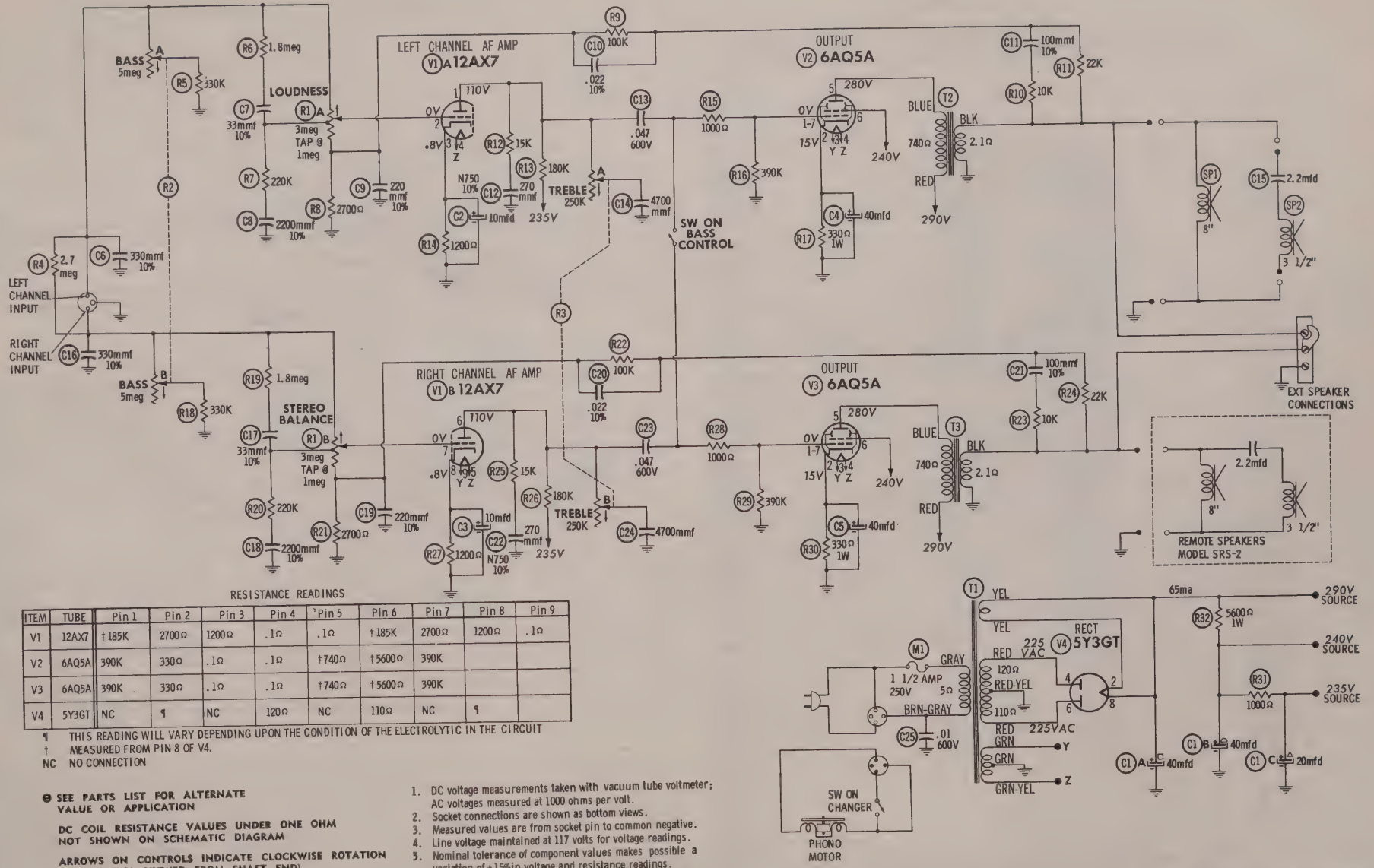
NAME	PART NO.	DESCRIPTION
Knob	46-2113	Volume (Stereo)
Knob	46-2114	Control (2 Used)
Cabinet	14-2566E	Model SF-112E
Cabinet	14-2566R	Model SF-112R
Cabinet	14-2566W	Model SF-112W

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS BOTTOM VIEW





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†185K	2700Ω	1200Ω	.1Ω	.1Ω	†185K	2700Ω	1200Ω	.1Ω
V2	6AQ5A	390K	330Ω	.1Ω	.1Ω	†740Ω	†5600Ω	390K		
V3	6AQ5A	390K	330Ω	.1Ω	.1Ω	†740Ω	†5600Ω	390K		
V4	5Y3GT	NC	¶	NC	120Ω	NC	110Ω	NC	¶	

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC IN THE CIRCUIT
† MEASURED FROM PIN 8 OF V4.
NC NO CONNECTION

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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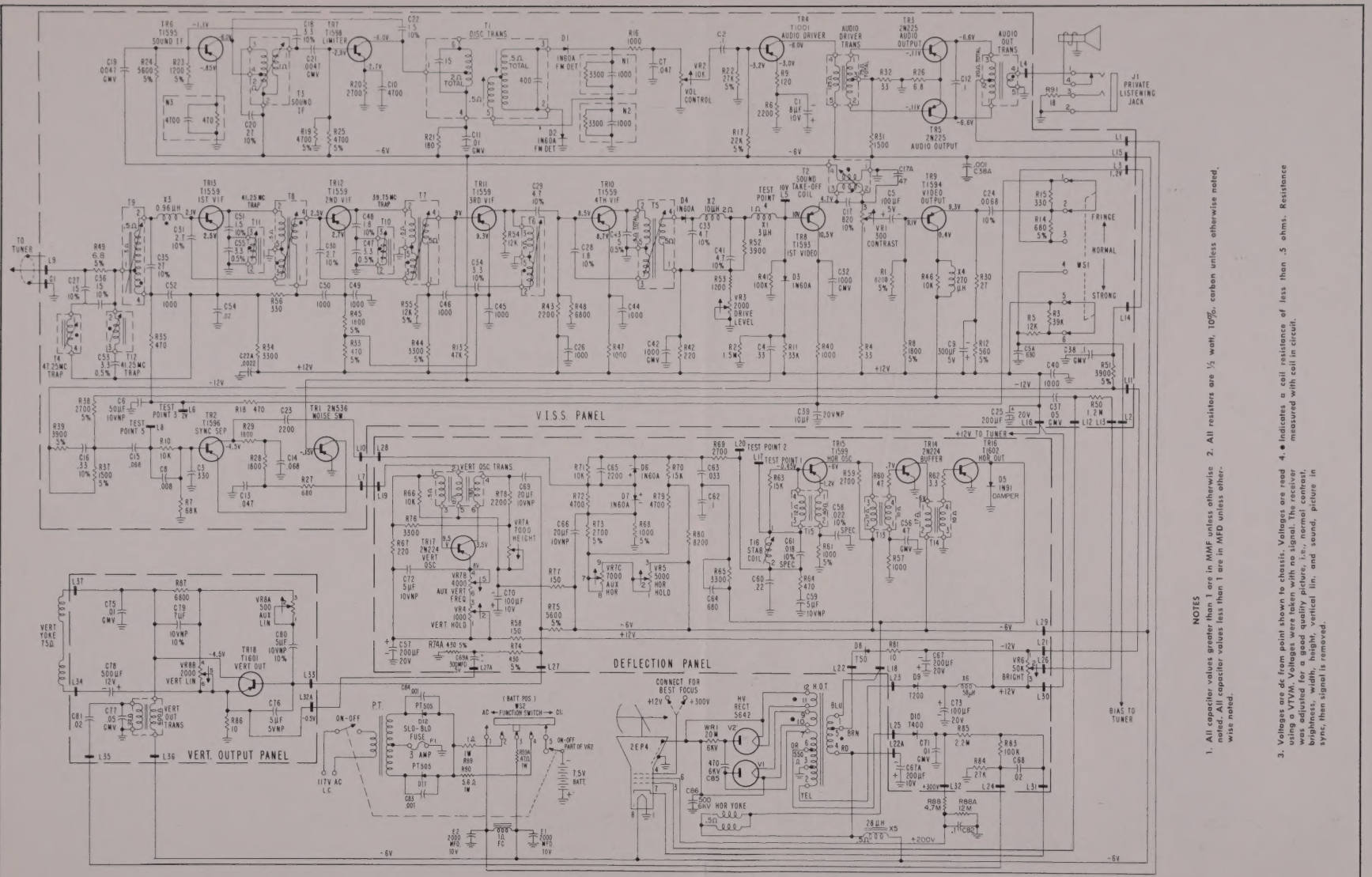
ZENITH MODELS SF112E, R, W (Ch. 4B24)



NOTES

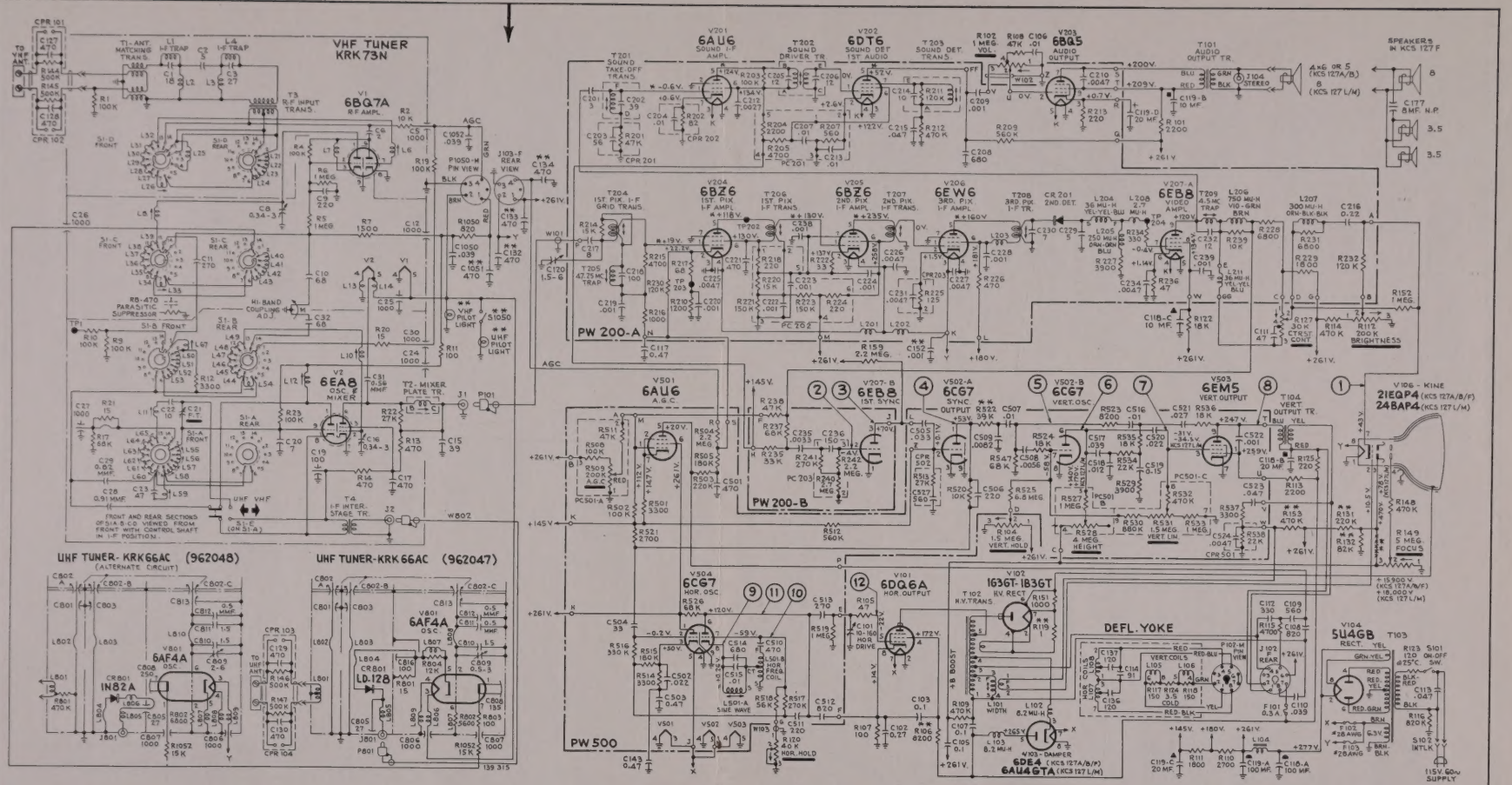
1. All capacitor values greater than 1 are in MMF unless otherwise noted. All capacitor values less than 1 are in MFD unless otherwise noted.
2. All resistors are ½ watt, 10%, carbon unless otherwise noted.
3. Voltages are dc from point shown to chassis. Voltages are read using a VTVM. Voltages were taken with no signal. The receiver was adjusted for a good quality picture, i.e., normal contrast, brightness, width, height, vertical lin. and sound, picture in sync, then signal is removed.
4. ● Indicates a coil resistance of less than .5 ohms. Resistance measured with coil in circuit.

PHILCO MODELS H2010BL, L (CH. 10AT10)

Schematic Diagram Courtesy of Philco Corporation

← PHILCO

RCA VICTOR



RCA VICTOR MODELS 210KA465, 210KA466, 210T195, 210T196, 210T199, 240K495, U, 240K496, 240K497 (CH. KCS127A, F, L, M)

All schematics are shown in the latest condition at the time of printing.

All resistance value in ohms. K = 1000.

All voltages measured with "Volt-Ohmyst" and with no signal input. Voltages should hold within ±20% with 117 v, a-c supply.

*Measured with 1 megohm, ½ watt resistor in series with meter probe.

All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.

Direction of arrows at controls indicates clockwise rotation.

Schematic Diagram Courtesy of Radio Corporation of America

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SET 460 FOLDER 26-S